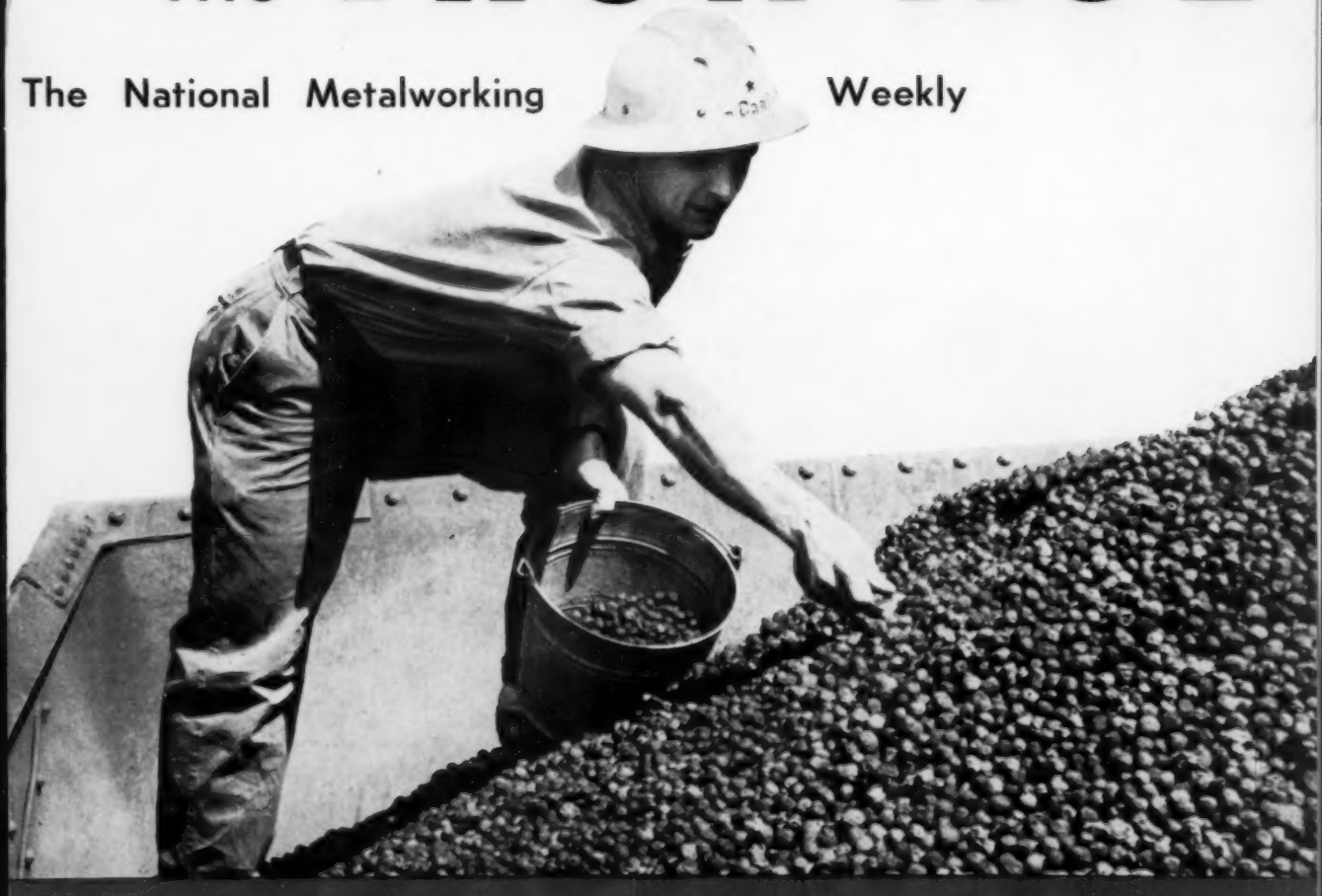
April 12, 1956

The IRON AGE

The National Metalworking Weekly



Taconite: Billion Dollar Bet Pays Off P.55

Is A Profit-Sharing Plan Profitable? P.60
CO_2 Cures Foundry Cores—In Seconds P.95
Digest of the Week P—2

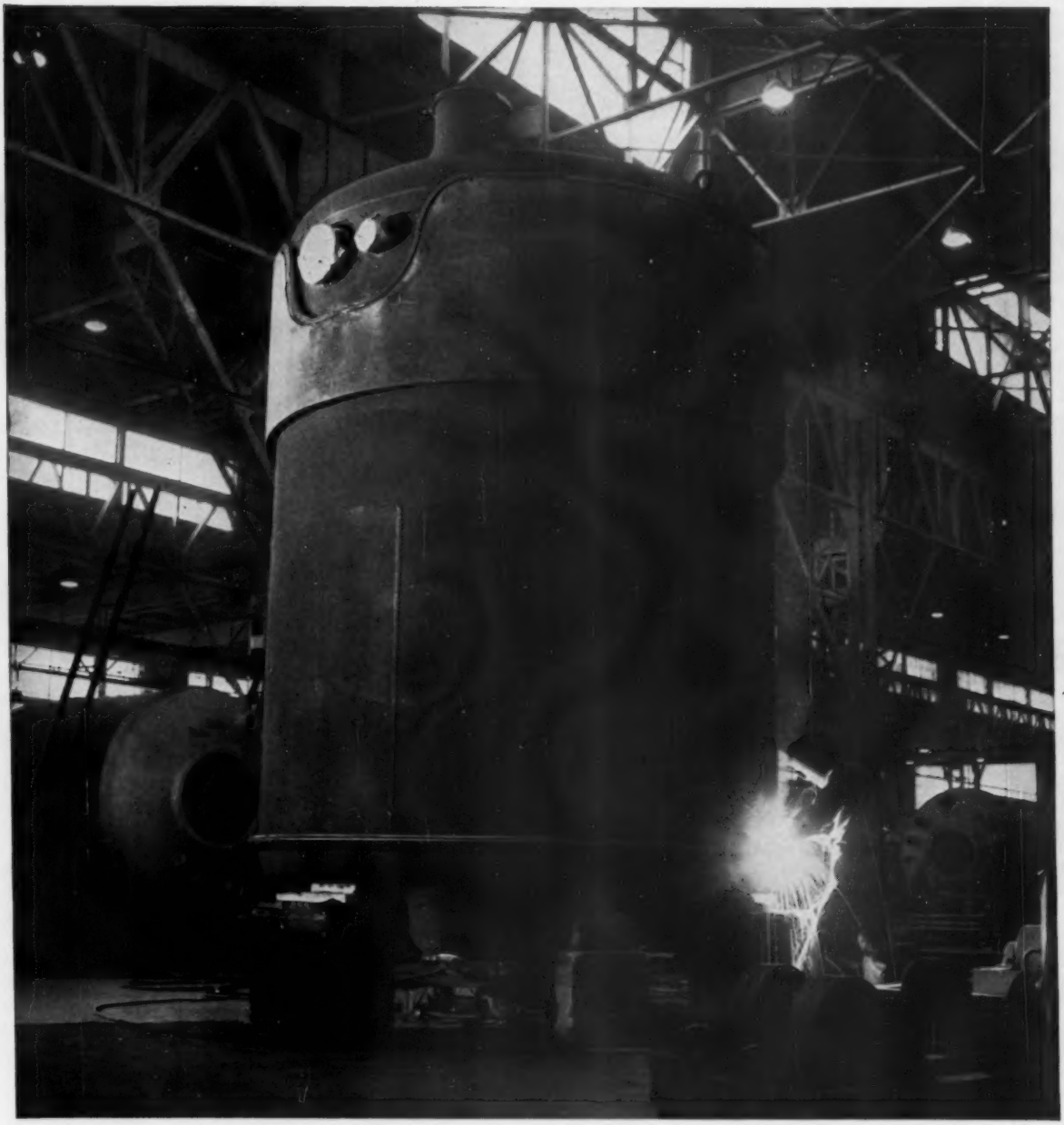
THE OTHER TURN

HM-M-M-M.
HM-M-M-M.
OLD MAN GRIGSBY COMES DOWN TO THE O.H. ONCT A YEAR, BUT HE STILL THINKS HE'S A MELTER WHEN HE GETS HERE.
YEH, AND THE ONLY TIME THE BOSS LOOKS AT A TEST ANYMORE IS WHEN GRIGSBY IS HERE. HE'S NO BETTER AT IT NOW THAN THE OLD MAN
BOTH OF THEM GUYS IS AFRAID TO CALL IT FIRST AND IF THEY DON'T LET BLACKIE OR MARTY GET A LOOK, THE POOR GUYS'LL GO NUTS!
KLEKES

The big stall

The benefits steelmakers obtain from our refractories are in part a result of Basic's on-the-job servicing. One of the rewards of this close relationship has been the opportunity to observe and appreciate the lighter side of these usually serious craftsmen.

BASIC INCORPORATED 845 HANNA BUILDING • CLEVELAND 15, OHIO



Welding Sealer Skirt on 8000-Gal Storage Tank

In this photograph, taken in the welding shop of the Pfaudler Co., Rochester, N. Y., a sealer skirt is being welded on a vertical-type pressure storage tank for the chemical industry. The tank has a capacity of 8,000 gal, is 160 in. long, and 108 in. in diameter. It was fabricated from ⅜-in. plate. It will be completely insulated and jacketed, and will also be glassed inside.

In fabricating a vessel of this kind, or any other type of welded tank, sound welds are essential to good performance. With Bethlehem plates, sound welds are assured, assuming of course that good welding techniques are employed. This is because the plates are well made, and of uniform quality.

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BETHLEHEM STEEL

DIGEST OF THE WEEK IN METALWORKING

April 12, 1956—Vol. 177, No. 15

The IRON AGE

Digest of the Week in Metal Working

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NEWS DEVELOPMENTS

CAN ALUMINUM HOLD AIRCRAFT MARKET? P. 59

Aluminum makers have considered aircraft industry their own personal property. But new adaptations of stainless steel, titanium and other alloys are now competing. Here are some new aluminum developments that will help hold aircraft business.

WHEN IS PROFIT SHARING PRACTICAL? P. 60

Profit sharing can boost production, raise company morale, and stimulate employee interest in company operations. There are an estimated 20,000 profit sharing plans of all types in U. S. industry. Half pay a share of profits as well as bank a share for retirement.

HOW TO ANALYZE MACHINE TOOL NEEDS P. 83

Can occasional lemons among machine tool purchases be guarded against? Ford Motor Co. suggests capability tests can help make decisions on tool purchases. Theory fits variations in machined parts into categories: machine-inherent or external.

PHILCO MECHANIZES IN FIGHT FOR LIFE P. 63

Philco Corp., Philadelphia, is spending millions of dollars to install mechanization systems in its television production plants in an effort to reduce production costs which have been driving its prices out of competitive line. Union is going along, at least for the present.

WHAT'S NEW IN SMOG CONTROL PROGRAM P. 64

Metalworking is taking lead in smog control programs. Industry is spending $300 million a year in basic smog research, studying local problems and installing anti-smog installations to clear up the air.

TACONITE is bringing a new lease on life to U. S. iron ore ranges. It also means record business for suppliers of mining and taconite mill machinery. Photo courtesy Reserve Mining Co. See story p. 55.

FUTURE WAR WOULD BRING TIGHT CONTROLS P. 77

If you thought World War II controls on metals were tight, think again. They're mild compared with what would happen in a future war. Feeling is that there'd be no time to prepare, so controls would be tight, immediate. Even bureaucrats have big plans to take care of paper work.

FEATURE ARTICLES

CURE CORES WITH CO_2 — IN SECONDS P. 95

Just 15 seconds needed to cure a 3-lb core—only 20 seconds for a 10-pounder. That's one shop's experience in curing cores with CO_2. Hard and sound, CO_2 treated cores are cured right in the core box. That means improved dimensional accuracy. Low unit cost is CO_2 selling point.

SINGLE GRINDERS 3 TIMES FASTER THAN PAIRS P. 99

Finish grinding parts on two machines means extra handling, loading and unloading. Saginaw Steering Gear Div. triples work grinding output per sq ft of floor space by substituting one machine for each pair formerly used. Besides saving time, they're grinding their precision power steering gear components to closer tolerances. Post-operation air gaging feeds part-size information back to the grinder.

FURNACE COMBINES ANNEALING, VACUUM DEGASSING P. 102

Vacuum equipment for heat treating operations could mark a new and important trend. Where metal degassing is a factor, vacuum furnaces offer a number of distinct advantages. For instance, a manufacturer of electronic power tubes put a vacuum furnace to work on annealing, degassing of steel rings, with significant savings.

ONE MAN PULLS STRINGS ON GIANT SCRAP SYSTEM P. 104

Scrap from a wide range of stamping presses is removed fast and efficiently by a streamlined system at Chrysler's Automotive Body Div. plant. One man controls entire system from central station, aided by TV, mirrors. Scrap drops through chutes adjoining presses. Cross-plant conveyors feed it to a longitudinal conveyor, thence to vertical conveyor, baler, gondolas.

PRY MORE SPEED FROM NEW TUBE MILL P. 108

Is newly-installed equipment necessarily the "last word" in performance efficiency? Engineers at Dana Corp.'s Marion, Ind., plant delight in trying to squeeze more out of brand new machinery. Take a tube mill installed just 3 years ago. Today its working 36 pct faster, with 3 less men.

MARKETS AND PRICES

SCREW MACHINE PRODUCTS MARKETS SOLID P. 61

Members of the National Screw Machine Products Assn. weren't talking for the record at their recent meeting. But it's a sure bet that business is up thus far in 1956. Only cautious attitudes come from fact that inquiries have dropped off.

TRUCKS PICK UP AUTO SALES SLACK P. 72

Building and highway construction in particular keep truck sales up in spite of drop in passenger car sales. Truck producers are making long range estimates in terms of bigger construction projects.

MORE WEST STEEL EXPANSION PLANNED P. 81

Booming steel market will match any planned increases. Kaiser announces $113 million program following Columbia-Geneva's announcement that it will integrate Pittsburg Works. And Bethlehem may also expand its West Coast facilities.

STEEL MARKET IS SOLID THROUGH JUNE P. 155

Scramble for steel reflects fear of a strike, certainty of price increases. But also it's based on solid needs in construction, particularly, industry generally. Conversion deals are being made in plate and structural, two items in strongest demand.

MILLS INDICATE AVERAGE COPPER PRICE P. 162

Copper mills have reduced their prices, basing current figures on 47.50¢ copper instead of the previous 49¢. This is best indication yet of average price of copper, and a goal of drive for world price.

NEXT WEEK:

BEHIND STEEL LABOR'S BARGAINING TEAM

After 20 years, the United Steel Workers of America has been forged into an efficient, formidable organization. Union bargainers have plenty of support when they sit down at the conference table. Here are the intimate details of the union's operations and personalities.

GET RID OF KINKS BY NEW TUBE-FORMING METHODS

Rectangular steel tubing makes strong, rigid framing. But how do you bend it without collapsing or kinking it? Chevrolet solved this problem in making side rails for auto frames. Hydraulically - operated expanding mandrels hug the inside walls of tubes during bending, preventing kinks.

Designing a new wire product?

Call American Steel & Wire!

Steel wire comes in so many different grades, shapes and finishes that it isn't easy to keep them all at your fingertips.

For this reason, we suggest that you give your American Steel & Wire representative a chance to help with new designs while they are still on the drawing board. He may be able to suggest 1) a more economical wire, 2) a wire that will fabricate more easily or 3) a slight design change that will simplify production or lower the cost of the raw material.

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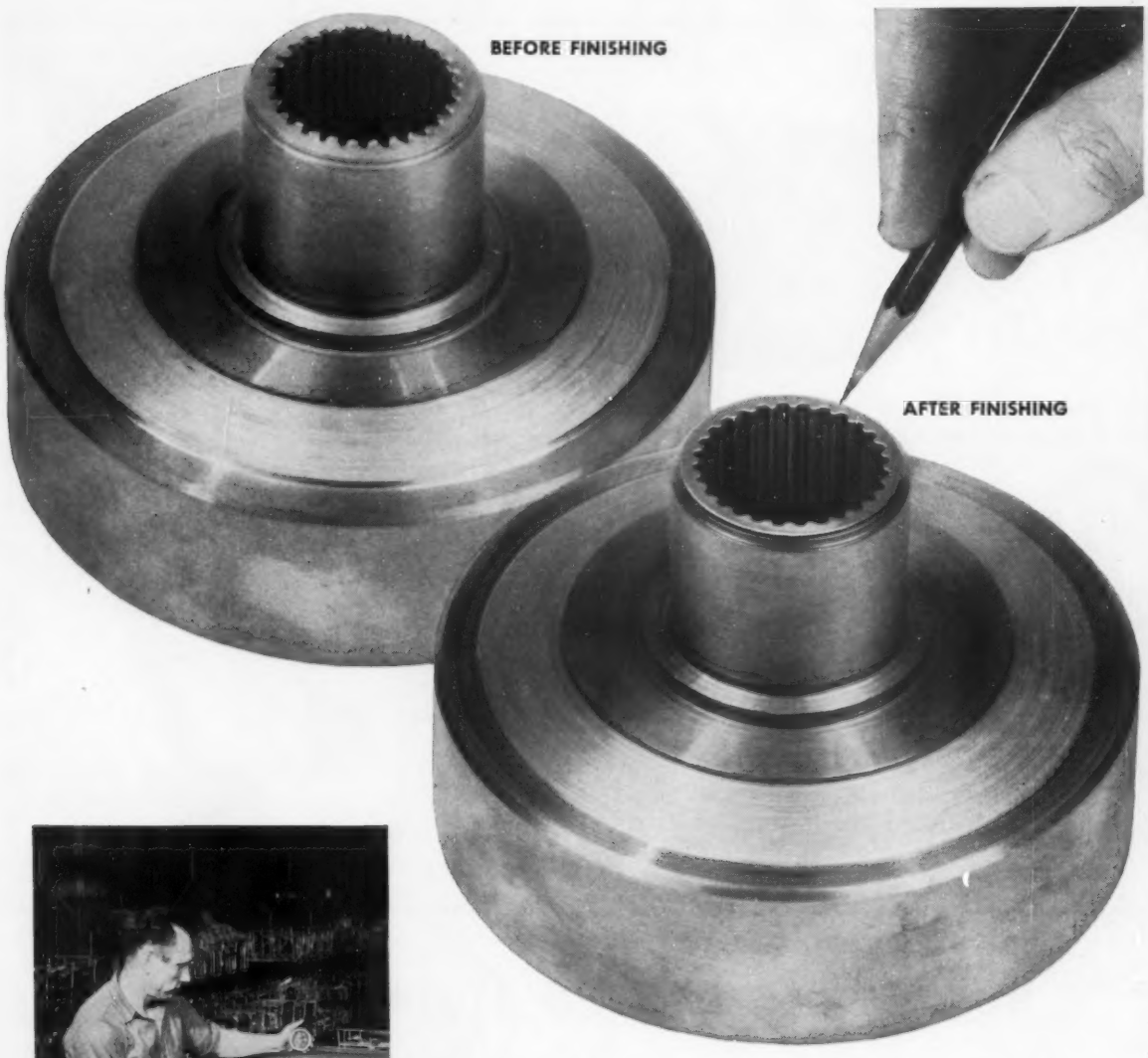

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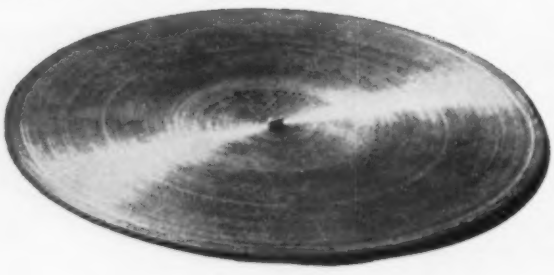

Stainless steel discs hardened to Rockwell C40 to 41 looked like this after heat-treating.

How Armco 17-4 PH Stainless Steel cured these heat-treating headaches

These parts were causing plenty of headaches for heat treat and the rest of the shop until they were made of Armco 17-4 PH Stainless Steel.

High temperatures required to harden grades formerly used caused severe distortion. This meant heat treat was saddled with costly, time-consuming straightening operations—plus the job of removing heavy scale.

Armco 17-4 PH eliminates these shop headaches. Distortion and scaling don't occur because this unusual high strength stainless steel can be fully hardened by heating at only 850 to 900 F for 1 hour and air cooling. With this low-temperature heat treatment, parts remain within tolerances and have only a light heat-tint discoloration.

These cost-cutting advantages also mean that you usually can finish-machine Armco 17-4 PH stainless parts before heat treatment. You don't have to reroute to the machine shop for finishing in the hardened condition.

If you are making hardened parts for corrosion resistant applications, Armco 17-4 PH Stainless Steel may help you cut costs and boost production.

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EPA NBP

EDITORIAL

Who Wants To Be President?

Pick up any "inside information" tip sheet and it will tell you that the steel shortage isn't the big thing. No sir. The big thing is the shortage—and a bigger one coming—of executive material.

To hear some of our elders talk it sure was tough in the "good old days" to be president of a struggling firm—or of one not so struggling. To them it is a cinch today.

Well we aren't so sure. After reading "Ailing Bosses" in the *Wall Street Journal;* talking to a few president friends of ours and ruminating generally maybe those chaps who go in for finger painting have the right slant.

The real up and coming president of a company today isn't supposed to have a personal life. The "up lift" books tell him to have one. But the board of directors and those who can't make up their own minds won't let him.

According to the Health Research Center in Chicago 92.6 pct of an executive group had something wrong with them when examined. What was worse; they had known about only 36.8 pct of the ailments; the others were unsuspected.

Comments on this study indicated that hundreds of thousands of dollars are lost because of the bosses' health. It is inferred—if not bluntly stated—that he is an "asset" of the company and the company can't afford the luxury of the head man taking to bed.

Then there is the matter of high income taxes. That doesn't bother some high priced bosses but it hits most of them. The so-called prerogative of apartments, meals and trips would be okay if it were not for the fact that business is the beginning and the end of most of these "fringes." Exceptions to this are few.

Then the president can't always tell those whom he doesn't like to go pound salt. He might like to but can't. That's where the ulcers and the heart cases get started.

The president has his bosses. He must be kind to the stockholders with ten shares, listen with rapt attention to members of the board, make decisions with abandon—and make a zillion.

What's more no one will believe all this. That is the unkindest cut of all for the president: Just a bed of roses they say.

Let's move doc, give a fellow a chance at that job!

Tom Campbell

EDITOR-IN-CHIEF

dear editor:

letters from readers

Program for Survival

Sir:

For quite some time your editorials in THE IRON AGE have been of interest to me. Just today your December 22 issue crossed my desk; your "Program for Survival" was extremely well done. With thinking like yours, expressed so well, our chances of survival are good, that is, if we put it into practice.

Please accept my thanks for framing so well the thoughts that I could not put together and sincere and best wishes for a continued supply of paper and ink. *R. D. Cherrigan, Chief Quarterman Rigger, Naval Shipyard, San Francisco, Calif.*

Warehouse Steel

Sir:

In line with your policy of giving comprehensive and factual coverage to important topics, we were particularly pleased with your timely analysis of the economy of warehouse buying in your special report of March 29, 1956.

Would you please send us one hundred copies of this excellent article? *C. E. Nordberg, Sales Manager, T. J. Rafferty & Co., Inc., Worcester, Mass.*

Sir:

We would appreciate approximately six reprints of your Special Report, "Warehouse Buying Economical," in the March 29, 1956, issue. Advise cost for quantity of 100.

This short article presents with a punch, information which we hope will alert more buyers and purchasing agents to the fact that warehouses can offer long-run economy as well as the priceless ingredient of service which has long been our traditional sales approach. *D. H. Evory, Sales Service, Burke Steel Co., Inc., Rochester, N. Y.*

Sir:

I have just finished reading the article in your March 29, 1956, issue, entitled "Warehouses: They Can Stretch Your Steel Dollar." This is one of the best articles I have ever read on this subject.

One point that should be emphasized, as an additional cost to warehouse *mill steel*, is the interest paid on money that may have had to be borrowed to pay for the mill shipment of steel and until the steel is used. *J. Katz, President, Diamond Steel Corp., Chicago, Ill.*

OEEC Digest

Sir:

In your March 8 issue on page 114 you had a very interesting article about a new publication by the Organization of European Economic Cooperation, concerning articles for U. S. industry.

Could you send me the address of this organization? *E. J. Boyer, Mossberg Pressed Steel Corp., Attleboro, Mass.*

Address is 2002 P St., N.W., Washington 6, D. C.—Ed.

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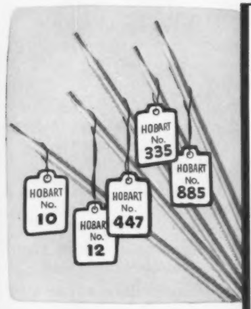

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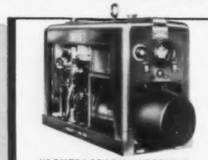

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dear editor: *letters from readers*

Program for Survival

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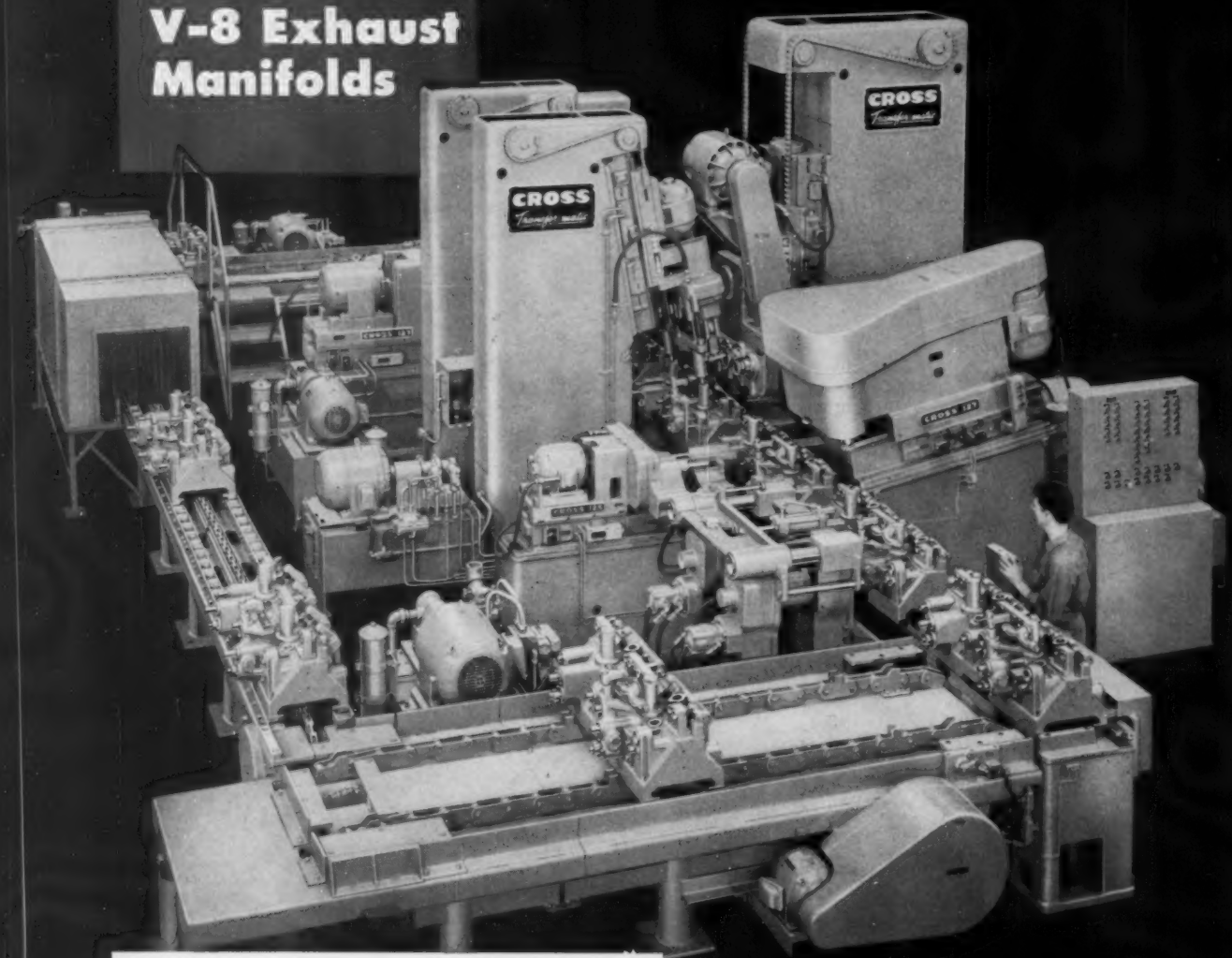
Completely Machines V-8 Exhaust Manifolds

Another Transfer-matic by Cross



- ★ 51 operations: 8 milling; 37 drilling, chamfering and spotfacing; and 6 tapping.
- ★ Palletized work holding fixtures for holding one right hand and one left hand part.
- ★ Automatic power wrench for operating work holding fixtures.
- ★ Automatic transfer mechanism.
- ★ All parts in Cross machines—even tooling details—are made to interchangeable tolerances for fast, easy maintenance.
- ★ Other features: Construction to JIC standards; hardened and ground ways; hydraulic feed and rapid traverse for milling, drilling and boring; individual lead screw feed for tapping.

Established 1898

THE CROSS CO.

First in Automation

DETROIT 7, MICHIGAN

fatigue cracks

by William M. Coffey

Tool Show Report

If people are wondering why they didn't see more of us at the Chicago Tool Engineers Show it's because we became quite wrapped up in one very unique exhibit and, we must confess, we spent practically all our time there.

Ross Cameron, president of the Ross Operating Valve Co., Detroit, Mich., was demonstrating his new Comet II multi-purpose valve. He had it coupled with a tube arrangement which produced "just the right amount" of a Manhattan or a Martini into a cocktail glass.

We had a swell talk with Ross and became interesting in how such a wonderful little gaget would work. Ross simmed very plissed and we sat around tisting his new valve. Now we like a littet gring now andthen. You can8t beat the combontion of good gin very mough and stiffed olives, beer ansquoth and bourbon are allrighr but you can't beat gin ermouth and even pickled onoions.

We have take a fourth or maybe afoftjf and we are more than evew convincede that Ross had aswell thingx in that walve of his/O wecould drinh Martinis alday and nefer quibber and etelash and no sworse a ctitzab than I ws vebore. This country is as good as it evew wax. We al know tazes are higt, but still we are well off in Usa. THEREujust inn8t a better countryx.*

This is Rosh . . .

Letters

Dear Willum:

i see yore munth as rolled around agin cum may. Tell me bud—aint yew made a boner agin in havin National Water Systems Month (what in heck's that?) runnin at the same time as National Tavern (saloon tew yew) Munth?

Yours in haste,
F. H. N. Carter
Vice President
Sunrod Mfg. Corp.

Carter, stay away from Rosh's new valve. Ane it was not a boner. As a matter of fact April is also Clean Oil Month, too.

Puzzlers

The answer to the aged age puzzler (March 15) is: Husband, 47; wife, 39; son, 17; and the twins are 11. Easy. And the honorable winners: James R. Crabill, Peter A. Frasse Co.; T. A. Carroll, Kennecott Copper Corp.; A. L. Chilman, Columbia-Geneva Steel; Stafford B. Beach, Jr., Republic Aviation Corp.; Arlan Walker, Iowa Ordnance Plant; William R. Mass; John Lund, Captain USMC, Procurement Section, Washington, D. C.; D. M. Ertner, Western Electric Co.; A. D. Darden, Higgins, Inc.; Ole Abe Raich, Colorado Fuel & Iron Corp.; Seymour L. Samet, Wayne Iron & Metal Co.; Bob Castle, Hoover Co.; Sarie and the General Steel Castings Iron Age Puzzle Club; Jim Mull and Mary Ann especially, Mary Ann; Phil Weber and Don Supremant, Dow Chemical Co.; George W. Frederick, Republic Steel Corp.; the Collins Radio Co. Iron Age Puzzle Club; Dorsey Smith, Harvey Aluminum; Marilyn Crawford, Crucible Steel Co.; and W. C. Cook, W. C. Nabors Co.

**With all apologies to Chxr7ez fa56an of Griswold-Eshleman, Cleveland and Mr. Ross.*

MEMO FROM THE PRESIDENT

Phil S. Coffer, President of C & H Supply Co., manufacturers of Metal-Cals

In our competitive economy, manufacturers and distributors constantly strive to improve their products and services. One of the newest improvements in product identification is Metal-Cals. They come in any size or shape with a variety of colors, and can be die cut to any design. America's leading industries are using Metal-Cals...the colorful, original, anodized and dyed, etched .003" aluminum foil. Metal-Cals are faster to apply than decals or name plates and do not require screws, pins, rivets or other fastening devices—they reduce labor and material cost in most applications. Metal-Cals "stick to the job" of trademarking, providing clear, sharp diagrams or serial numbering for operating or maintenance instructions for your products. We would appreciate it if you would send in this coupon so that you may examine Metal-Cals and see why they are industry's most modern and economical method of product identification.

Metal-Cal®

INDUSTRY'S MOST MODERN METHOD OF PRODUCT IDENTIFICATION

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Manufactured by C&H Supply Co.
415 E. Beach Ave., Inglewood 3, Calif.
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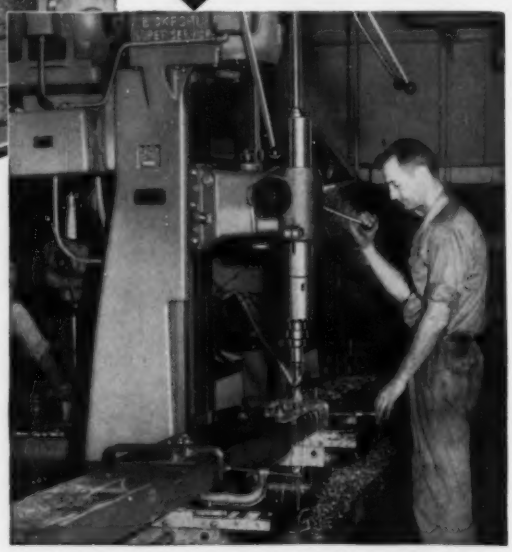
PAT. PENDING

The 9″ dia. column 3′ arm Cincinnati Super Service Radial is working on chassis frame parts and aluminum steering column brackets; ¼″ dia. to 1¼″ holes drilled and reamed to a .0015″ tolerance.

The Upright Drill shown is one of six 28″ Super Service Uprights working on heat treated alloy steel frames.



Money-making Cincinnati Bickford machines ... at The Autocar Division, WHITE MOTOR CO. —EXTON, PA.

Photos courtesy the Autocar Division of The White Motor Company, Exton, Pennsylvania.

Speed and easy handling—power and accurate, steady performance were factors in the selection of Cincinnati Bickford Super Service Radial and Upright Drills in this plant. They are quickly adaptable to a variety of operations, including drilling, reaming, tapping and trepanning.

For rapid, accurate, dependable production investigate these cost reducing modern drilling machines.

Write for Bulletin R21C.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

Cincinnati 9, Ohio, U.S.A.

GIDDINGS & LEWIS MACHINE TOOL CO. : Fond Du Lac, Wisconsin

dates to remember

APRIL

SHEET METAL CONTRACTORS ASSN.—Convention, April 16-17, Abraham Lincoln Hotel, Springfield, Ill. Society headquarters, 1928 Fullerton Ave., Chicago.

ASSN. OF CONSULTING CHEMISTS & CHEMICAL ENGINEERS, INC.—Symposium and general meeting, April 18, Belmont Plaza Hotel, New York. Assn. headquarters, 50 E. 41st St., New York.

GAS APPLIANCE MANUFACTURERS ASSN.—Annual meeting, April 19-21, The Greenbrier, White Sulphur Springs, W. Va. Assn. headquarters, 60 E. 42nd St., New York.

EXPOSITIONS

AMERICAN FOUNDRYMEN'S SOCIETY—May 3-9, Atlantic City, N. J.

AMERICAN WELDING SOCIETY—May 7-11, Buffalo, N. Y.

MATERIALS HANDLING SHOW, June 5-8, Cleveland.

ASSN. OF IRON & STEEL ENGINEERS, Sept. 25-28, Cleveland.

METAL SHOW—Oct. 8-12, Cleveland.

AMERICAN ZINC INSTITUTE—38th Annual meeting, April 23-24, Hotel Statler, St. Louis, Mo. Society headquarters, 60 E. 42nd St., New York City.

THE GALVANIZERS COMMITTEE—34th meeting, April 23-24, Hotel Statler, St. Louis. Society headquarters, 60 E. 42nd St., New York.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—National meeting, April 26-27, Bradford Hotel, Boston. Institute headquarters, 33 W. 39th St., New York.

MAY

NON-FERROUS FOUNDERS' SOCIETY—Annual meeting, May 3, Marlborough-Blenheim, Atlantic City, N. J. Society headquarters, 192 N. Clark St., Chicago.

AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS—1956 Pacific Northwest regional conference, May 3-5, Olympic Hotel, Seattle. Society headquarters, 29 W. 39th St., New York.

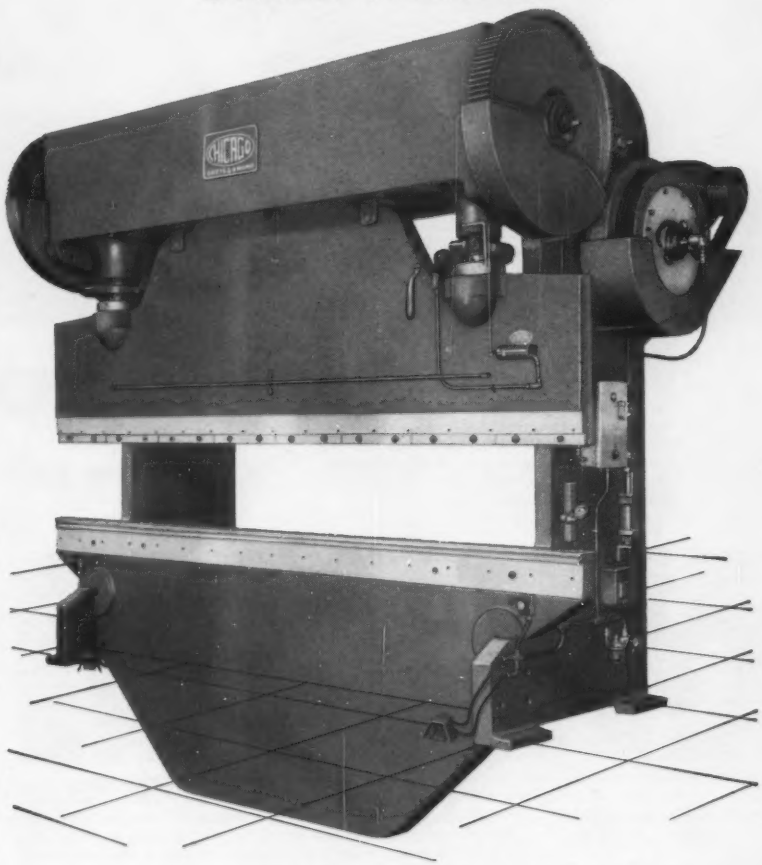
THE NATIONAL ASSN. OF SHEET METAL DISTRIBUTORS—46th spring meeting, May 14-15, Hotel Roosevelt, Pittsburgh. Assn. headquarters, 1900 Arch St., Philadelphia.

CONCRETE REINFORCING STEEL INSTITUTE—Annual meeting, May 28-June 2, The Greenbrier, White Sulphur Springs, W. Va. Institute headquarters, 39 S. Dearborn St., Chicago.

CHICAGO DREIS & KRUMP

Press Brakes

FOR BENDING • FORMING STEEL PLATES



The most modern design throughout with all the features for the fastest bending and forming of steel plates. Large variety of standard sizes and capacities. Also modified designs for special production work.

Complete Engineering Recommendations for Any Job on Request 6150

CHICAGO DREIS & KRUMP

Press Brakes • Straight-Side Presses • Press Brake Dies

Hand and Power Brakes • Special Metal-Forming Machines

DREIS & KRUMP MANUFACTURING CO.

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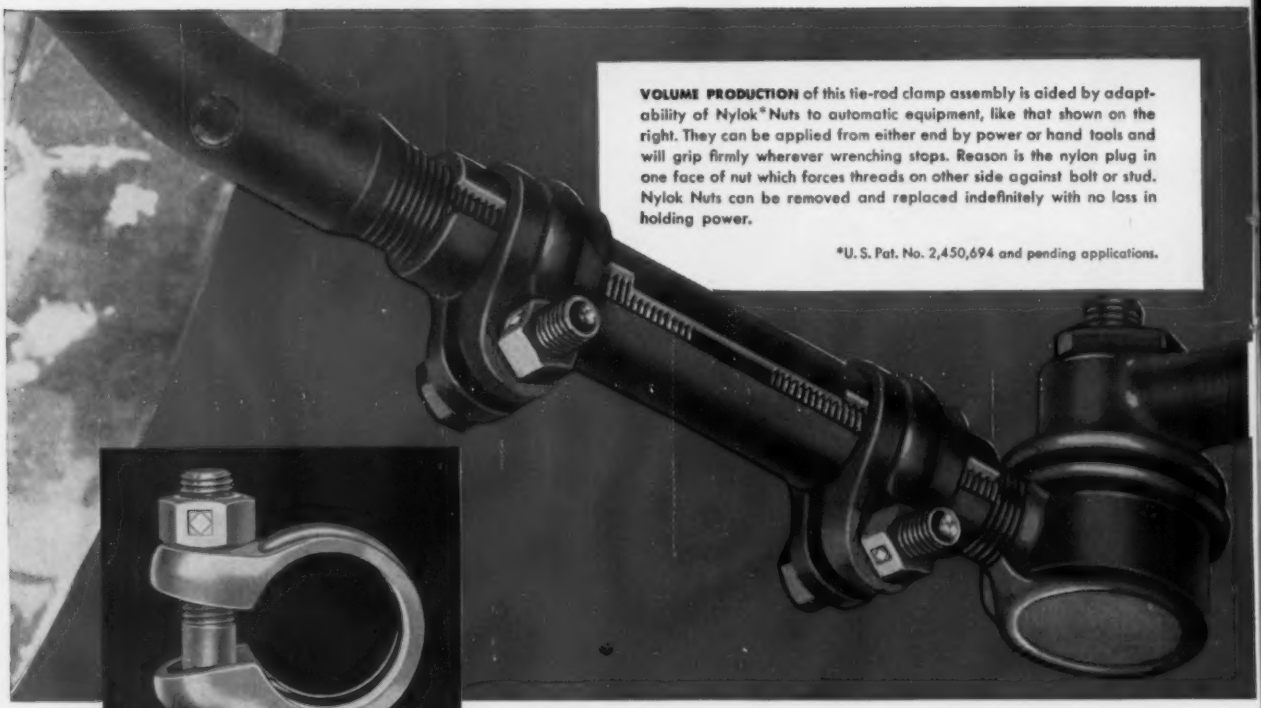
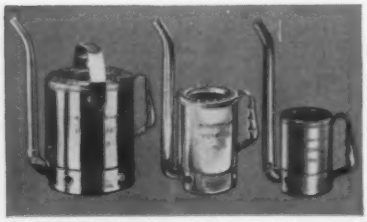


VOLUME PRODUCTION of this tie-rod clamp assembly is aided by adaptability of Nylok* Nuts to automatic equipment, like that shown on the right. They can be applied from either end by power or hand tools and will grip firmly wherever wrenching stops. Reason is the nylon plug in one face of nut which forces threads on other side against bolt or stud. Nylok Nuts can be removed and replaced indefinitely with no loss in holding power.

*U. S. Pat. No. 2,450,694 and pending applications.

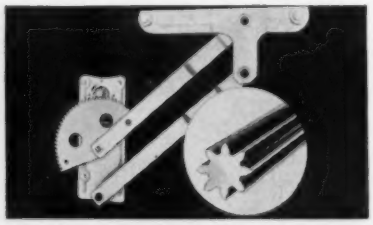
POWERFUL CLAMP ACTION, maintained by Nylok Nuts, keeps vital steering tie-rod assembly securely in adjustment. Republic Nylok Nuts are currently in use on thousands of critical applications subject to shock, vibration and cyclic loading. Clip and mail the coupon for details.

NYLOK NUTS provide positive



FAST PRODUCTION of quality spouts for these oil dispensers is secured by using Republic ELECTRUNITE® Mechanical Tubing. The manufacturer, Swingspout Measure Company, Los Angeles, California, finds ELECTRUNITE easy to swedge and bend as required. Because Republic controls quality from ore to finished tubing, uniform strength, cross-section and ductility are assured. These characteristics underwrite quality in products fabricated from ELECTRUNITE. Send coupon for literature.

ELECTRO PAINTLOK® DOUBLES PRODUCTION of this water cooler manufacturer's painting and drying facilities. How? Because for this particular job Republic Electro Paintlok requires only one pass through paint shop and drying oven instead of two trips needed for uncoated sheets. Also, Electro Paintlok produces a superior finish. Its chemically treated coating actually grips paint . . . and even when scratched, limits corrosion to point of damage. Mail coupon for data.

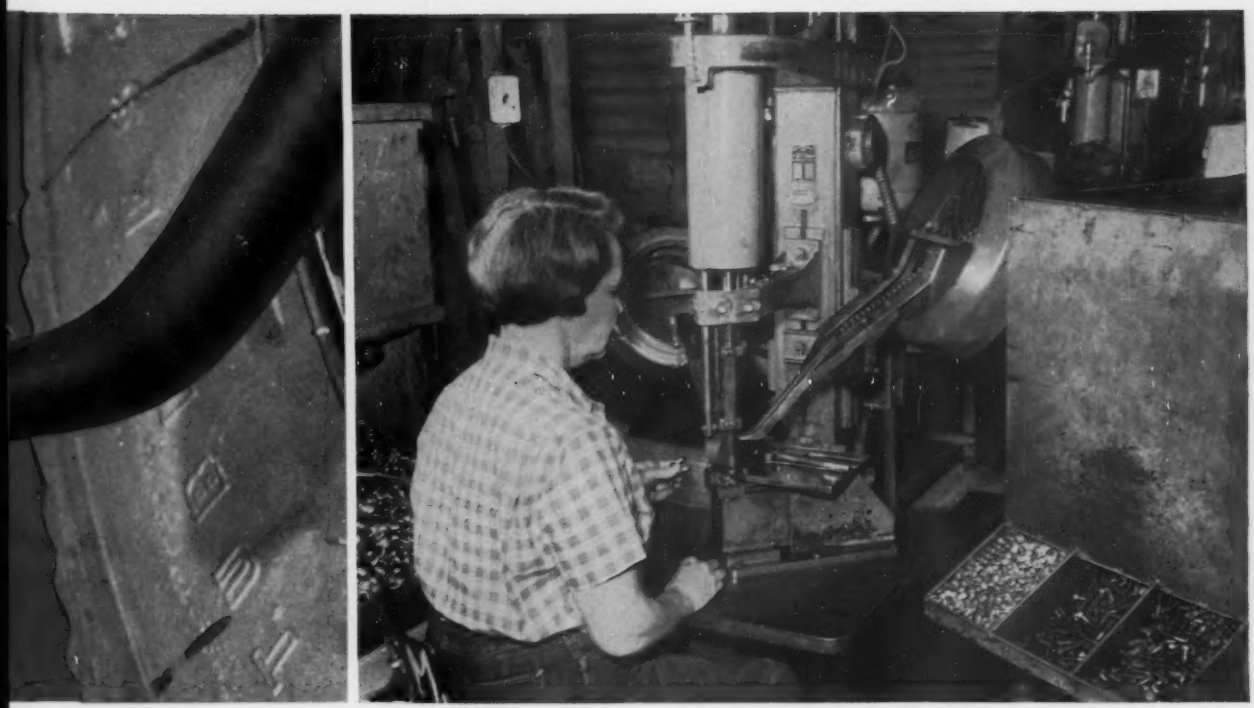


ECONOMICAL, VOLUME PRODUCTION of many parts starts with Republic Cold Drawn Special Sections. For example, the gear shown on this automobile window lift assembly is simply cut from a special section and drilled. In other cases, machining is minimized or eliminated entirely, thanks to fine surface and close tolerance produced by cold drawing. Design to take advantage of special sections and save. For facts, send coupon.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels



SPEED PRODUCTION...

locking and easy adjustment

In line with current emphasis on safety equipment in the automotive industry, engineers are studying every detail to assure maximum operating security. That's one of the reasons why Thompson Products, Inc., Michigan Division, has switched to Nylok Nuts for their steering tie-rod clamp assembly . . . produced for several top automobile manufacturers.

Actually, Thompson has found Nylok Nuts ideal for this application from several standpoints. For instance, they speed production by eliminating handling and assembly of lock washers . . . and since either end is up, Nylok Nuts are ideal for automatic feeding and power wrenching. In addition, they lock tightly even when not seated. Pre-assembled clamps can be freely handled with no possibility of losing the nut or bolt.

Finally, Nylok Nuts retain their grip after any number of tie-rod adjustments. They can be easily backed off with hand tools, and after the adjustment is made, wrenched tight again to stay.

Republic Nylok Nuts have been used in countless applications to speed assembly and provide maximum holding power under all conditions. Why not check your product to see where they will work to advantage for you? For complete information, contact your local Republic Bolt and Chain Division representative, or mail the coupon.

STEEL

and Steel Products

REPUBLIC STEEL CORPORATION
Dept. C-1309
3104 East 45th Street
Cleveland 27, Ohio

Please send me further data on:
- ☐ Nylok Nuts ☐ Electro Paintlok
- ☐ ELECTRUNITE Mechanical Tubing
- ☐ Cold Finished Special Sections

Name_____ Title_____

Company_____

Address_____

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Introducing the COMET JR.

An Advanced Conception of Valving by Ross!

- Direct solenoid operated, balanced spool 4-Way—for air or oil service.
- Engineered and built to tolerances of .0001".
- Conforms to JIC standards.
- Complete valve cycle within 0.033 sec.
- Made of aluminum—single solenoid, base mounted weighs only 3½ lbs.
- Working surfaces almost as hard as a diamond.
- Small and compact—7¼" by 3½" by 3⅞". ¼" diameter flow capacity.
- Available with ¼" or ⅜" pipe tap for inline, manifold or base mounted; single solenoid spring return, double solenoid momentary; double solenoid three position.

Write, wire or phone for complete information

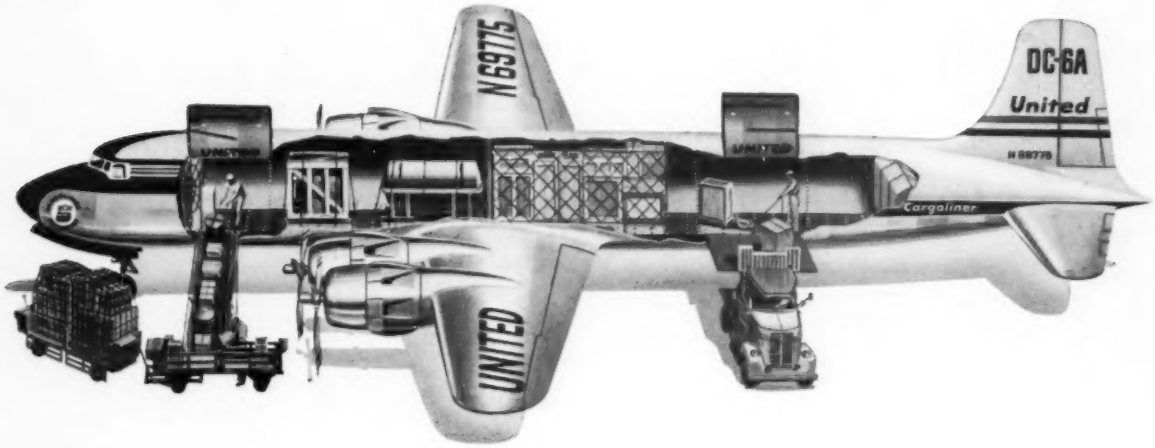
ROSS Control VALVES

Tomorrow's EnginAIRing Delivered Today . . . Anywhere

Ross OPERATING VALVE COMPANY

130 E. GOLDEN GATE AVENUE • DETROIT 3 • MICHIGAN

UNITED—with DC-6A Cargoliners—gives you "EXTRAS" no other cargo carrier can match!



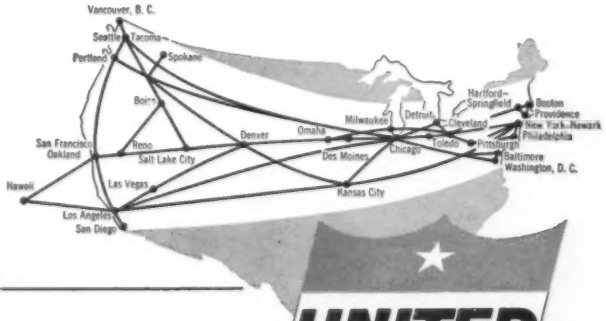
EXTRA Air Freight Capacity—each new DC-6A carries up to 30,000 pounds of cargo at 300 mph. Single pieces up to 76″ x 81″ x 115″ and up to 8000 pounds can be shipped by DC-6A Cargoliner.

EXTRA Dependability—all of United's new DC-6A Cargoliners* are equipped with radar for smoother flights and better on-time performance. No other airline offers radar-equipped cargo planes.

PLUS these "EXTRAS" in schedules and service:

- *Telemeter Airbill—the complete airbill arrives in advance of your shipment.*
- *Reserved Air Freight Space aboard all Mainliners, Cargoliners, and connecting world-wide carriers.*
- *Every United flight—both passenger and cargo planes—carries freight between the 80 cities on United's Main Line Airway.*

EXTRA DC-6A Heavy-cargo Features—including motorized tug bar for precision handling of heavy pieces . . . tie-down strength greater than any other airline's cargo planes . . . pre-loaded mobile pallets.



UNITED AIR LINES

For service or information, call the nearest United Air Lines Representative. Write for free Air Freight booklet. Cargo Sales Division, Dept. IA-4, United Air Lines, 5959 S. Cicero Ave., Chicago 38.

New "triple duty" Danly Press

-Draws-Blanks-Forms

FINGERTIP GEAR CHANGE AND EXTRA LONG SHUT HEIGHT ADJUSTMENT PERMIT QUICK SHIFT FROM BLANKING TO DRAWING OPERATIONS...SOLVE SHORT-RUN STAMPING PROBLEM FOR LEADING HEATING UNIT MANUFACTURER

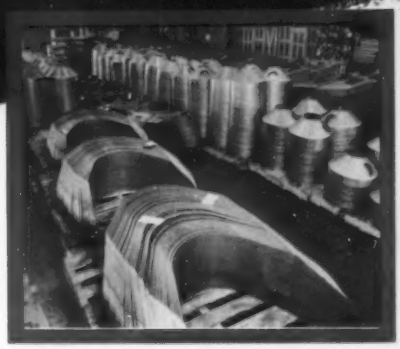
A leading manufacturer of home heating units needed a great variety of stampings . . . large blanks, drawn parts and deep formed pieces. Stamping these parts on a relatively short-run production basis would tie up entire lines of presses . . . unless one press could do the job. A specially designed Danly Press that blanks, draws and forms . . . and converts to these three types of operations quickly and easily . . . solved the problem.

Two unusual features give this "triple duty" Danly Press its unusual adaptability. First, the 24" stroke with a 30" range of shut height adjustment accommodates shallow blanking operations or deep dies for drawing and forming. Second, special gearing controlled from the master panel is easily changed to permit stroking at two speeds – one ideal for drawing, the other faster for blanking. Speed selection is controlled from the operator's station. The result: a "triple duty" Danly Press suitable for producing a tremendous variety of big stampings.

If your operation requires short production runs of a great many different kinds of stampings, Danly can help solve your production problem, conserve workhours and manpower. Danly presses will make your pressroom more efficient for your specific type of work. *Talk with a Danly engineer – soon!*

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue
Chicago 50, Illinois

Write for complete single action straight side press catalog



Stocks of parts produced on the specially built "triple duty" Danly Press. Note variety and size, particularly depth of form on V-shape stampings.

The contrast in these parts typifies the production problem solved by the Danly "triple duty" press.

An array of stampings like this would normally require several types of presses.

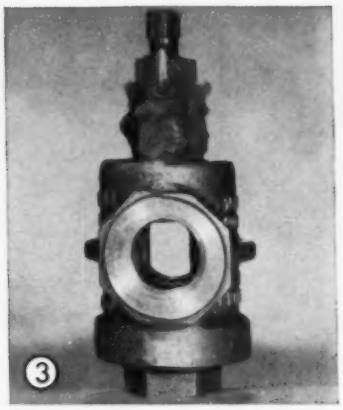
DANLY®

*SEE HOW *Controlled*
PRESSURIZED LUBRICATION
GUARANTEES LOWEST COST SERVICE FROM

HOMESTEAD *lubricated* PLUG VALVES

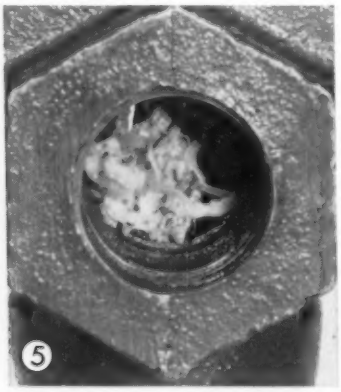
This plug was removed from a Homestead Valve just after starting lubrication, and before all sealing areas were filled with lubricant. Note that pressurized lubricant continues to extrude through feeder holes. Momentary downward movement of plug at start of each lubrication, gives assurance that plug is always free to turn.

The plug was again withdrawn from the valve body just after a ring of lubricant around the stem indicated that the lubricant system was full. Note that all lubricant grooves are filled. The entire plug surface is coated with lubricant. Lubricant is well packed in the stem sealing area above the plug.



Now valve has been purposely over-lubricated as indicated by excess lubricant around stem. Note that with *controlled* pressurized lubrication there is no extrusion or seepage of lubricant into valve port opening. This means no waste, no contamination of line fluids, no clogging of low pressure lines with lubricant, or fouling of meters, orifices, etc.

Also, in the Homestead Valve with *controlled* lubrication, you will note that even though the valve has been over-lubricated, lubricant comes only to the bottom edge of the plug, and is not wasted by discharging in quantity into the bottom chamber.



Now, see for yourself the risk involved when a valve which does *not* have Homestead's *controlled* Pressurized Lubrication, is over-lubricated. Note lubricant has been forced into the port opening. It can contaminate line fluids, foul meters or orifices, or even block low pressure lines!

*Unretouched photos.

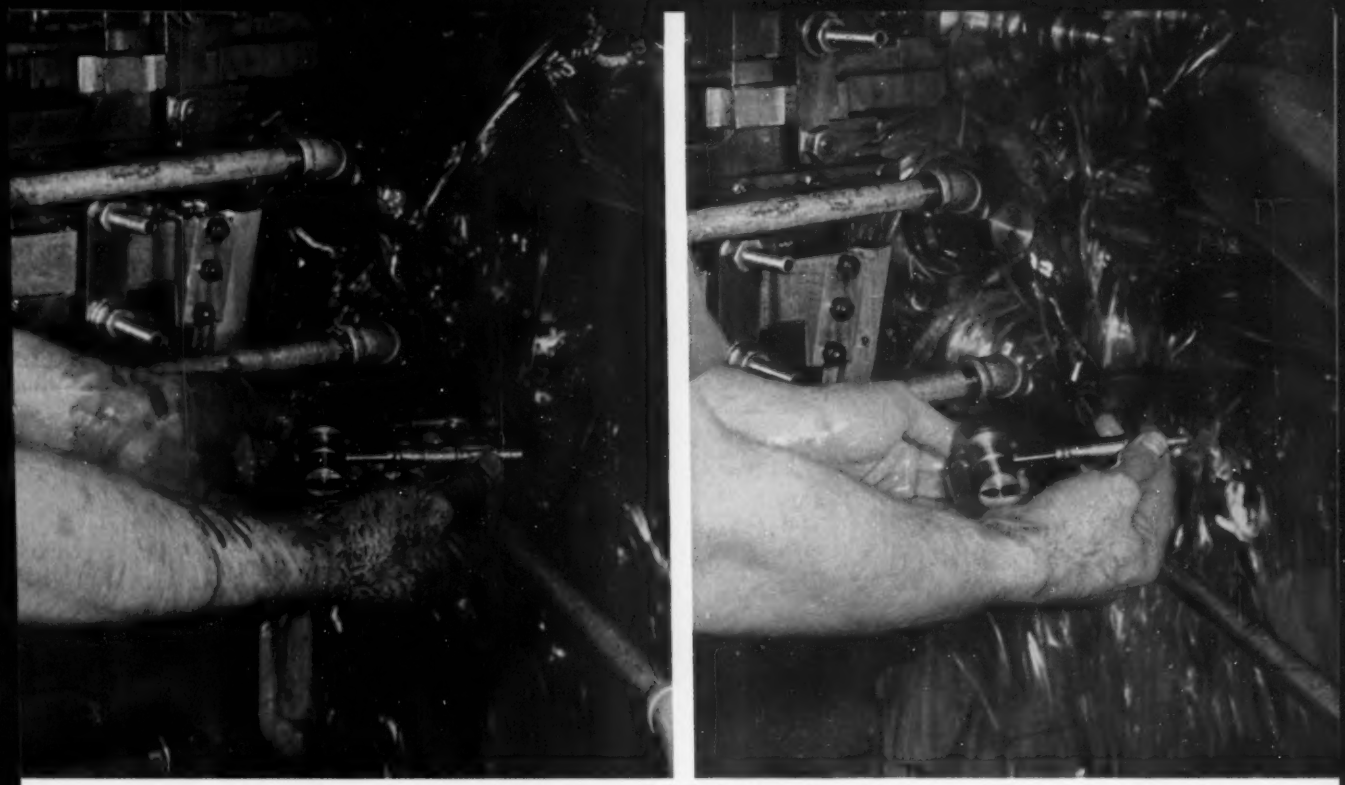
These are but a few of the many advantages of Homestead's controlled pressurized lubrication that guarantee lowest cost valve service.

Reference Book 39-5 has the full story—twenty-eight pages of engineering facts, sizes, types, dimensions, etc. Ask for your copy today. There is no obligation.

HOMESTEAD LUBRICATED PLUG VALVE (Pat. Pend.)

HOMESTEAD VALVE MANUFACTURING COMPANY

P. O. Box 23 *"Serving Since 1892"* Coraopolis, Pa.



Black cutting oil (left) makes close control difficult. Operators dislike dirty operating conditions it creates. Close control is easier and workers are happier with transparent Sunicut cutting oil (right).

WHY USE A BLACK CUTTING OIL WHEN YOU DON'T NEED IT?

Sunicut oils give you better visibility without sacrificing machining efficiency.

When trying to maintain close control over machines producing precision parts, operators can be handicapped by "black-oil blindness". It is hard to see the tools, the workpiece, and the finishes. Checking close tolerances is difficult when the graduations on micrometers and gauges are obscured.

Worse still, as the operator sees it, are the dirty working conditions caused by dark oils. His clothes get saturated with hard-to-remove stains, and his hands are black from one end of the shift to the other.

Transparent Sunicut oils help keep your operators happy and will make close control easier ...and transparent Sunicut oils will do the job with no sacrifice in machining speed or finishes.

To get the full story on Sunicut oils, see your local Sun representative, or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-41.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

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IN CANADA: SUN OIL COMPANY LIMITED, TORONTO AND MONTREAL

For any machining or grinding operation...

THERE'S A SUN OIL THAT'LL GIVE YOU HIGH EFFICIENCY AND LOW OVER-ALL COST

No two machine shops have exactly the same problems when it comes to selecting cutting oils...even when they're running the same job. And, until somebody comes up with the truly universal cutting oil, you can't afford to disregard the importance of oil selection. Here's how Sun can help you.

First, Sun makes a complete line of emulsifying and straight cutting and grinding oils. Second, your Sun representative, backed up by field engineers, has the necessary practical experience to recommend the oil that will give you both high machining efficiency and low over-all costs.

For the full story about Sun's cutting oils, see your Sun representative...or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. I-42.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY PHILADELPHIA 3, PA.

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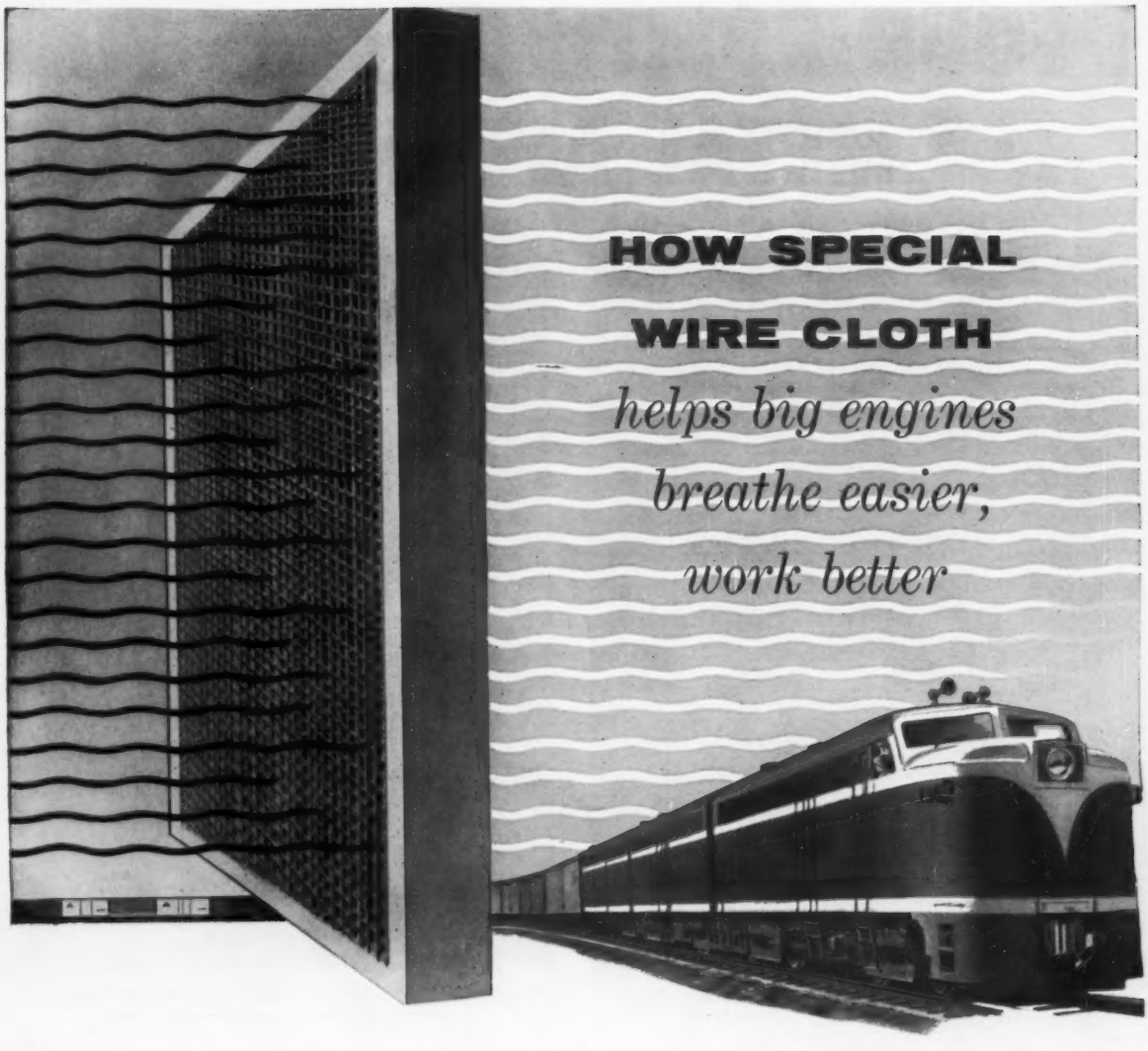


● Keeping harmful grit and dirt out of the lungs of big engines, like locomotive diesels, is no small problem. Determined to do the job better than ever before, a leading filter manufacturer turned to the *Reynolds Wire Division* of National-Standard for a special wire cloth that would trap all the dirt and still let such engines breathe the terrific volume of air they need.

No simple assignment this, for it took months of concentrated development work—not only to develop the *kind* of wire cloth that would do the job, but also to find out *how best* to produce it. It had to be slit into narrow widths, with special lock wires to prevent raveling. It had to withstand a patented method of severe forming and crimping without compacting. And despite the special construction and narrow slitting, it had to be furnished in extra large continuous rolls. All were tough problems to lick!

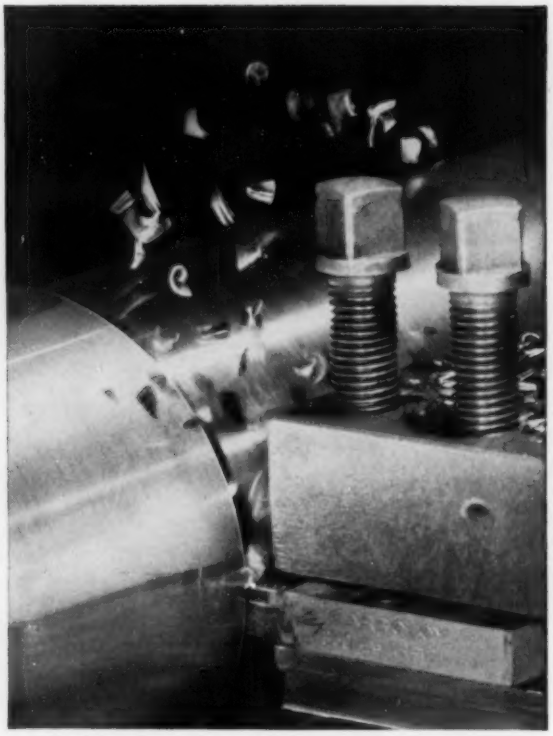
The *ability* to lick a tough problem in wire cloth is one thing. The *willingness* to do it is quite another. You get *both* at Reynolds Wire. But, problem or no problem, short orders or large volume production, you too will find it pays to turn to Reynolds. Try us and see.

NS
NATIONAL-STANDARD Company
NILES, MICHIGAN

NATIONAL-STANDARD COMPANY • NILES, MICHIGAN
Tire Wire, Stainless, Fabricated Braids and Tape
ATHENIA STEEL DIVISION • CLIFTON, N. J.
Flat, High Carbon, Cold Rolled Spring Steel
REYNOLDS WIRE DIVISION • DIXON, ILLINOIS
Industrial Wire Cloth
WAGNER LITHO MACHINERY DIVISION • JERSEY CITY, N. J.
Special Machinery for Metal Decorating
WORCESTER WIRE WORKS DIVISION • WORCESTER, MASS.
Round and Shaped Steel Wire, Small Sizes

FOUR POSITIVE STEPS YOU METAL AT THE LOWEST

Carboloy Machinability Computer accurately determines most efficient setup conditions.



Carboloy Grades 350 and 370 cut faster, wear longer. (Picture taken at 1/1000 second).

1 Solve machining problems with the new Carboloy® Machinability Computer, and you'll cut out hours of nonproductive setup time, and eliminate wasteful tryout runs. Faster, more accurately than any other method, the Computer determines the most efficient operating conditions for both simple and complex jobs.

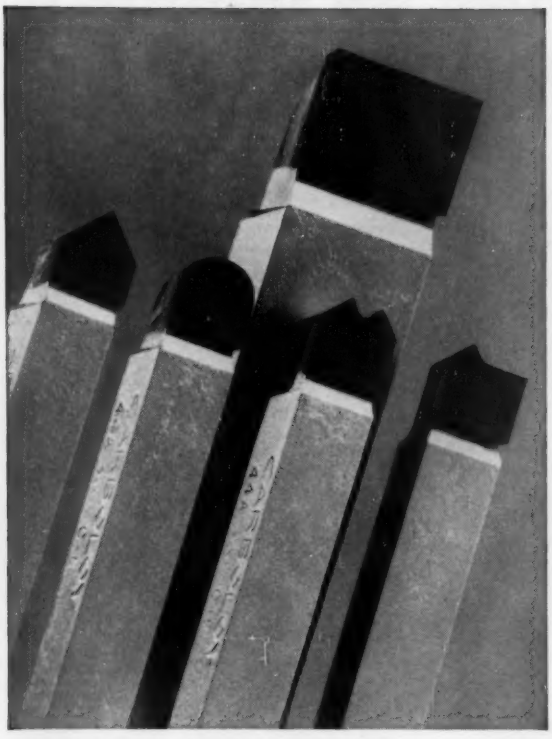
In seconds, it calculates the effect of the 19 most critical machining variables on the material to be cut, the cutting tool, and the cutting conditions. It shows how to set up optimum cutting conditions the first time a job is run, as well as how to improve existing setups. Price of the Computer is $495, f.o.b. Detroit.

2 Cut steel with Carboloy® Grades 350 and 370, and you'll increase production while reducing downtime and tool costs. Hundreds of in-plant comparison tests have proved these grades greatly outperform conventional carbides . . . providing the lowest tool-cost-per-piece of any carbide on the market today.

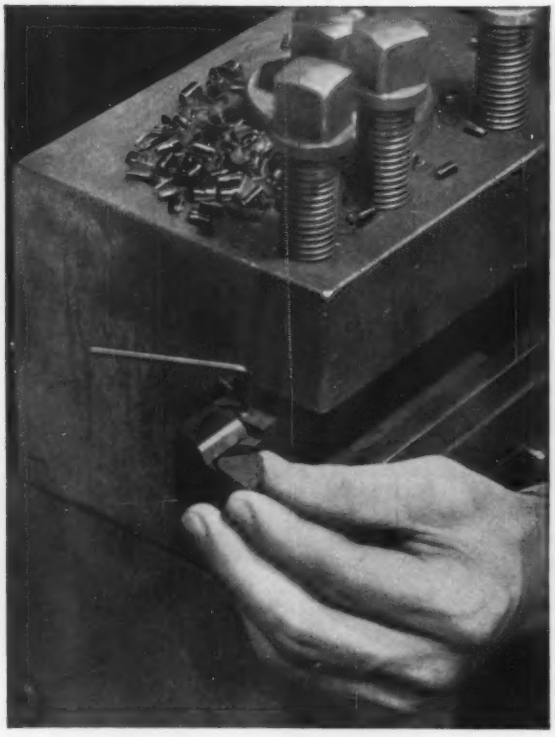
There are no "equivalent grades" for Carboloy 350 and 370, because these grades have a built-in structural rigidity that enables them to take deeper, more punishing cuts without the edge deformation encountered in other carbides. They will cut faster, wear longer, and get more production from your existing machine tools.

Consistent use of these Carboloy products will help you get maximum output from your machine tools . . . at lowest possible cost. For more information and tooling assistance, contact your local Authorized Carboloy Distributor (listed in the Yellow Pages of your phone book), or your Carboloy Representative.

CAN TAKE NOW TO CUT POSSIBLE COST



Style C Standard Carboloy Tool and typical special shapes quickly adaptable from it.



New Carboloy Toolholders can be indexed quickly, easily . . . right in the machine.

3 Apply Standard Carboloy Tools wherever possible, and you'll eliminate many higher cost "specials," while reducing over-all single-point tool inventories by as much as 30%. By standardizing, you will be using only 13 basic styles —"as is," or ground to special shapes – on up to 80% of your setups where braze-type tooling is used.

There are no inventory problems when you use "standards." These versatile tools are stocked in grades to handle any job from roughing to finishing on metals or nonmetals. You can get immediate delivery and tooling assistance from your local Authorized Carboloy Distributor.

4 Make maximum use of the new, easier-to-use Carboloy Toolholders, and you'll reduce tool-change time and lower insert costs. These holders employ a special clamping device combined with a carbide chipbreaker, which makes it possible to index a blank rapidly and accurately without removing the holder from the machine.

In addition, they utilize a shock-absorbent pad beneath the cutting blank, to permit the use of thinner, more economical inserts at increased speeds and feeds. And, because they are versatile, precision tools, they can be quickly adapted to many jobs you are now forced to tool with costly "specials."

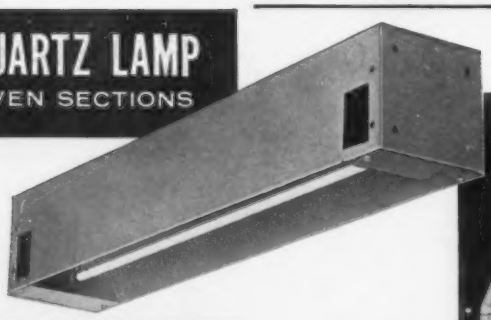
CARBOLOY
DEPARTMENT OF GENERAL ELECTRIC COMPANY
11153 E. 8 Mile St., Detroit 32, Michigan

"Carboloy" is the trademark for products of the Carboloy Department of General Electric Company

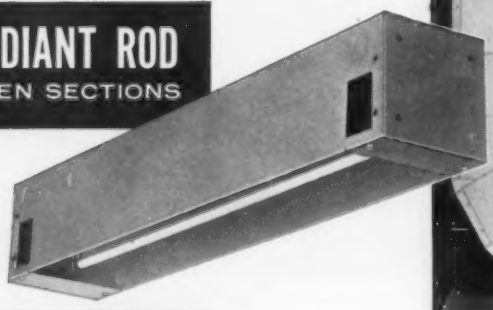
Check FOSTORIA'S Full Line of Radiant Heating Equipment...

Select Components or Complete Ovens from **3** *SOURCES OF INFRARED ENERGY*

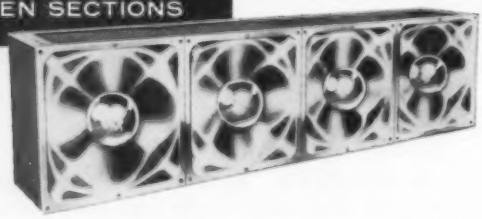
1 QUARTZ LAMP OVEN SECTIONS

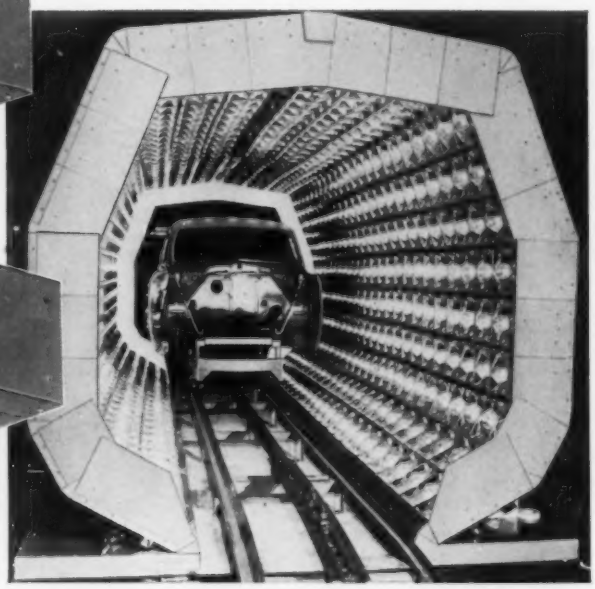


2 RADIANT ROD OVEN SECTIONS



3 INFRARED LAMP OVEN SECTIONS





Fostoria Complete Radiant Ovens

INFRA-RED fostoria SYSTEM

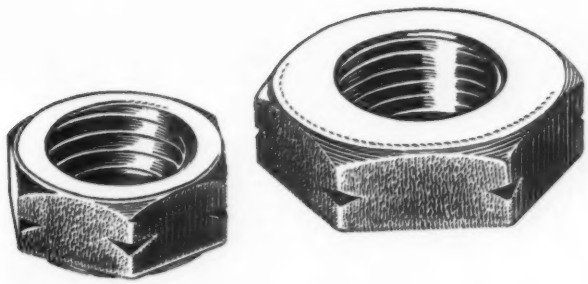
Whatever the industrial application for radiant heat, FOSTORIA can recommend and supply the *type* of equipment best suited for the job. The FOSTORIA line includes equipment incorporating *several sources:* **(1)** The new T-3 quartz lamp **(2)** Far infrared metal elements, and **(3)** G-30 and R-40 near infrared lamps.

Because Fostoria manufactures *a complete line* of sections, portable units and specially engineered ovens . . . *of all three types,* when you take your heating problem to Fostoria, you get an exclusive brand of heating "know-how," that is available *only* from Fostoria—the pioneer manufacturer of Radiant Heating Equipment. Get complete details on the FOSTORIA line today! See your nearby Fostoria Sales Engineer right away, or write direct.

Write Department 424 Today For Free Descriptive Literature 5508

FOSTORIA PRESSED STEEL Corporation • Fostoria, Ohio

Pioneer Manufacturer of Radiant Equipment . . . Components to Complete Ovens

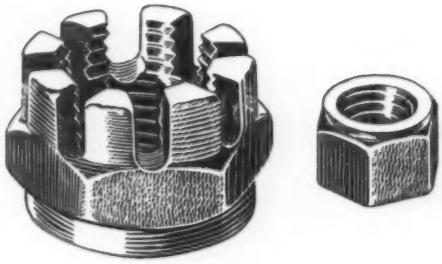


the quality of product you get out of a machine –

is dependent, first,

on the quality of material

you put in . . .



The expression, "mass perfection", might well be applied to nuts of the quality illustrated above. Some are simple, others complicated. But, all bear the unmistakable mark of quality—a mark inherent in the products produced from Youngstown Cold Finished Bars.

There are no stringy chips to get caught in the cut-off blade on an automatic; they're small and break off easily. In fact, you can eliminate most grinding operations.

Youngstown Cold Finished Bars have that desirable uniformity and machineability. They are free of injurious seams. Cracked steel rarely turns up. If you use automatics, it will pay you to get in touch with your nearest Youngstown District Sales Office.

QUALITY YOUNGSTOWN SERVICE

Youngstown Cold Finished Bars

THE YOUNGSTOWN SHEET AND TUBE COMPANY *Manufacturers of Carbon, Alloy and Yoloy Steel*

General Offices Youngstown, Ohio District Sales Offices in Principal Cities.

SHEETS - STRIP - PLATES - STANDARD PIPE - LINE PIPE - OIL COUNTRY TUBULAR GOODS - CONDUIT AND EMT - MECHANICAL TUBING - COLD FINISHED BARS - HOT ROLLED BARS - WIRE - HOT ROLLED RODS - COKE TIN PLATE - ELECTROLYTIC TIN PLATE - BLACK PLATE - RAILROAD TRACK SPIKES - MINE ROOF BOLTS

GENERAL ELECTRIC ANNOUNCES...

NEW Industrial

Direct-current Motor

KINAMATIC* a new standard in direct-current motors, gives your machines wider speed ranges, greater output

To meet modern industrial needs for faster, more automatic, more continuous production, General Electric has designed an entirely new direct-current motor—the d-c Kinamatic.

Designed for Automation—Now, a direct-current motor has been designed for the modern job it has to do—either as individual motor drive or in regulating systems. The new General Electric d-c Kinamatic motor supplies the wide speed range and versatility required for today's manufacturing methods. It is designed for the close control of machines and split-second timing of processes essential to higher output.

Accelerated Production—The new d-c Kinamatic motor will modernize your equipment, give it increased power, higher speeds, greater output capacity. With the quick-acting G-E Kinamatic motor, your machines will process a greater variety of products . . . faster . . . easier . . . and with less maintenance and spoilage.

More Powerful—By combining advanced design with improved materials and manufacturing techniques, General Electric engineers have packed more power into the entire Kinamatic line. The powerful Kinamatic motor, with new stamina and durability, is ready to become one of your most effective weapons for keeping costs down, for meeting competition, for boosting productivity levels.

Engineering Help—Industrial specialists in 149 conveniently located General Electric Apparatus Sales Offices have the complete story on how the new d-c Kinamatic motors and generators can benefit your operation. For full details, contact your G-E Sales Representative, or write for Bulletin GEA-6355. *Direct Current Motor and Generator Department, General Electric Company, Erie, Pennsylvania.* 813-1

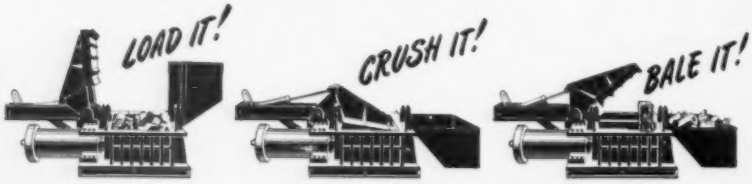
* Trade Mark of the General Electric Company

Progress Is Our Most Important Product

GENERAL ELECTRIC

Now Dempster-Balester Presses offer you PUSH-BUTTON scrap metal baling!

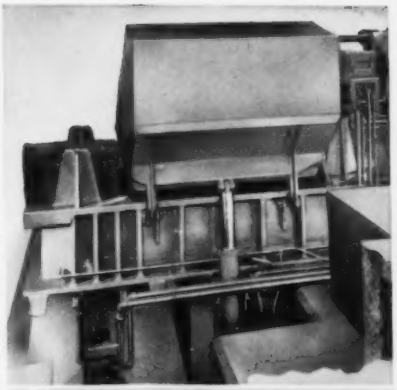
ONE MAN can PUSH-BUTTON-OPERATE one or several Dempster-Balesters! One press may be the Dempster-Balester Model 129. Another the Model 351. Another the Model 701, etc. Each may be the same model, or there may be several of one model, one of another.



IN ADDITION, one or all may be fully equipped with exclusive Dempster-Balester Auxiliary-Compression Door that enables you to bale in a 1-2-3 continuous cycle (see LOAD IT, CRUSH IT, BALE IT illustrations above). This Auxiliary-Compression Door does not "beat" or "Tamp" the scrap. It actually penetrates into the charging box, hydraulically compressing the scrap with a 45-ton force.

PUSH-BUTTON PANEL

1



2

3

Photo 1 shows push-button controlled Skip Pan dumping load into charging box. Skip Pan returns to be re-loaded and (Photo 2) Charging Box Door moves out, pushing last bale forward, clear of charging box. Bale ejector returns to lowered position. Pusher rams proceed to bale the scrap and then automatically retract. Charging Box Door opens (see Photo 3), bale is ejected and Skip Pan, which has been re-loaded, is ready to dump another load into box for baling.

DO YOU NEED one Dempster-Balester or several? What model? With or without Auxiliary-Compression Door? With or without push-button control panel? Should your press produce one particular size bale, or be equipped to produce different size bales? Isn't it time we got together? Tremendous savings are yours with the right press, properly engineered and equipped to meet your particular requirements. Ask us to give you complete information. *A product of Dempster Brothers, Inc. Sold in Canada by the W. P. Favorite Co., Ltd., 418 Main Street East, Hamilton, Ontario.*

DEMPSTER BALESTER®

DEMPSTER BROTHERS, 446 N. Knox, Knoxville 17, Tennessee

Empire State Building, world's tallest building.

It's outstanding!

EVERY MANUFACTURER who tries Roebling high carbon flat spring steel discovers the same thing... that this spring steel is absolutely unexcelled for dimensional and mechanical uniformity... for speeding production and cutting down rejects.

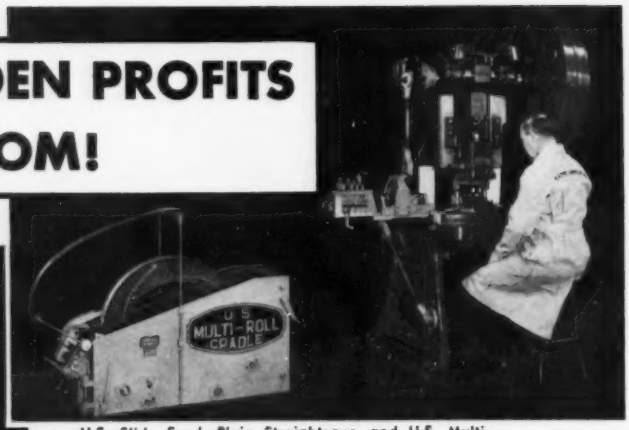
You always *pay* for the best when you buy flat spring steel... make sure you *get* it by specifying Roebling. John A. Roebling's Sons Corporation, Trenton 2, N. J.

ROEBLING CF&I

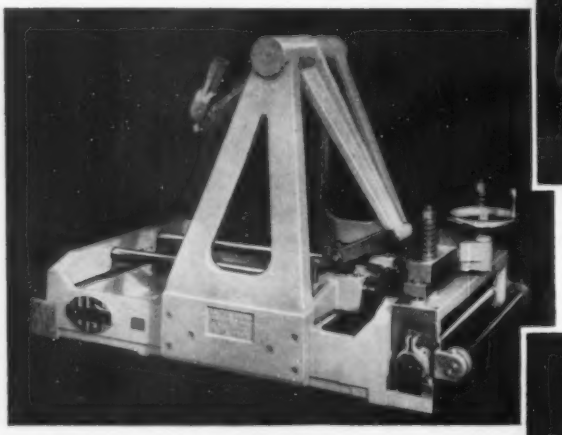
A subsidiary of The Colorado Fuel and Iron Corporation

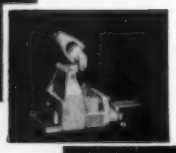
BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

UNCOVER THE HIDDEN PROFITS IN YOUR PRESS ROOM!



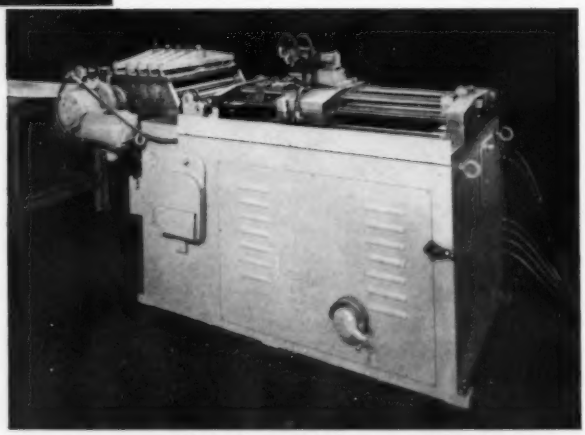
U.S. Slide Feed, Plain Straightener, and U.S. Multi-Roll Cradle used in conjunction with conventional O.B.I. Press.





Smallest and largest sizes of U.S. Slide Feeds which we now build. To the left, Model SF-24-24 capable of handling material up to 24 inches in width, with feed length adjustable up to a maximum of 24 inches. To the right, Model SF-00 capable of handling material up to 1½ inches in width with feed length adjustable up to a maximum of 1 inch.

WITH U.S. AUTOMATIC PRESS ROOM EQUIPMENT



SFC-24-24 U.S. Cabinet Mounted Individually Motor Driven Slide Feed capable of handling material up to 24 inches in width, with feed length adjustable up to a maximum of 24 inches at one stroke. Equipped with Stock Straightener with a pair of Motor Driven take-in rolls suitable for material up to .060 in thickness. This feed can be cycled to obtain feed lengths over 24 inches.

By converting your presses into automatic machines you are able to reduce piece part costs. You, like all other manufacturers, are interested in attaining this end result. The units illustrated are only a few of the different types of Feeds, Straighteners, Coil Cradles and Stock Reels included in our line. These and our other units have been designed and built with the end result of "Automatic Operation" in mind.

The use of this equipment gives you the double advantage of increased production and reduced labor costs, plus the feature of flexibility. Within their capacity, U. S. Slide Feeds can be easily adapted to handle materials varying in width, thickness and length of feed. Furthermore, U. S. Slide Feeds are designed so that the length of feed is controlled between positive stops providing consistent accuracy that is especially desirable in progressive die operations.

If you use presses in your production program, be sure to write for a copy of our Bulletins No. 80-C and 90-C illustrating and describing U. S. Automatic Press Room Equipment.

U.S. TOOL COMPANY, Inc.

AMPERE (East Orange)
NEW JERSEY

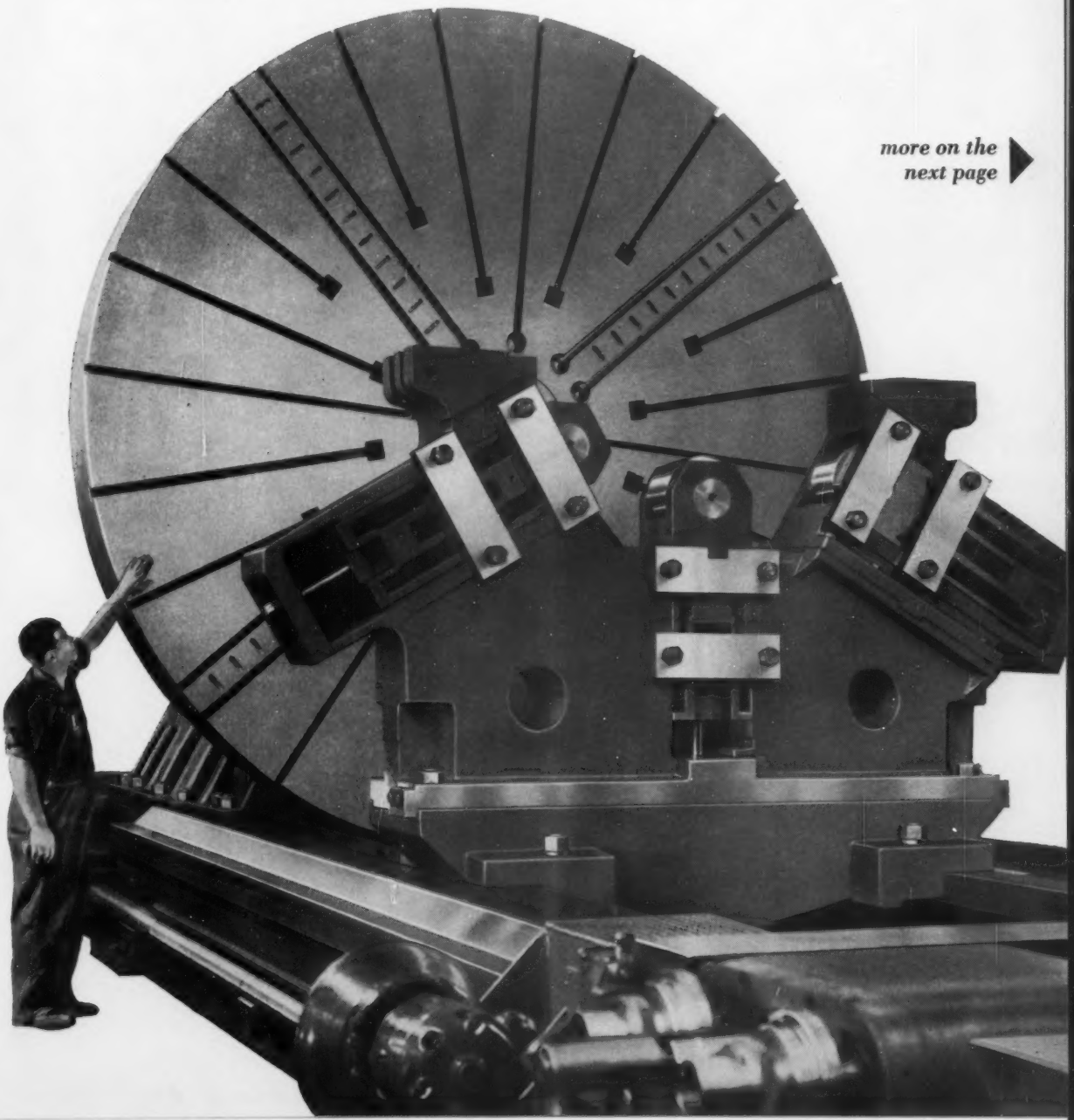
Builders of U. S. Multi-Slides — U. S. Multi-Millers
U. S. Automatic Press Room Equipment — U. S. Die Sets and Accessories

The man's no midget

He's 6 feet tall and the lathe is the heaviest and most powerful general purpose lathe ever built in the U. S. A.

Consolidated built it of course, and the price (if you are interested) is around a half million dollars.

more on the next page ▶



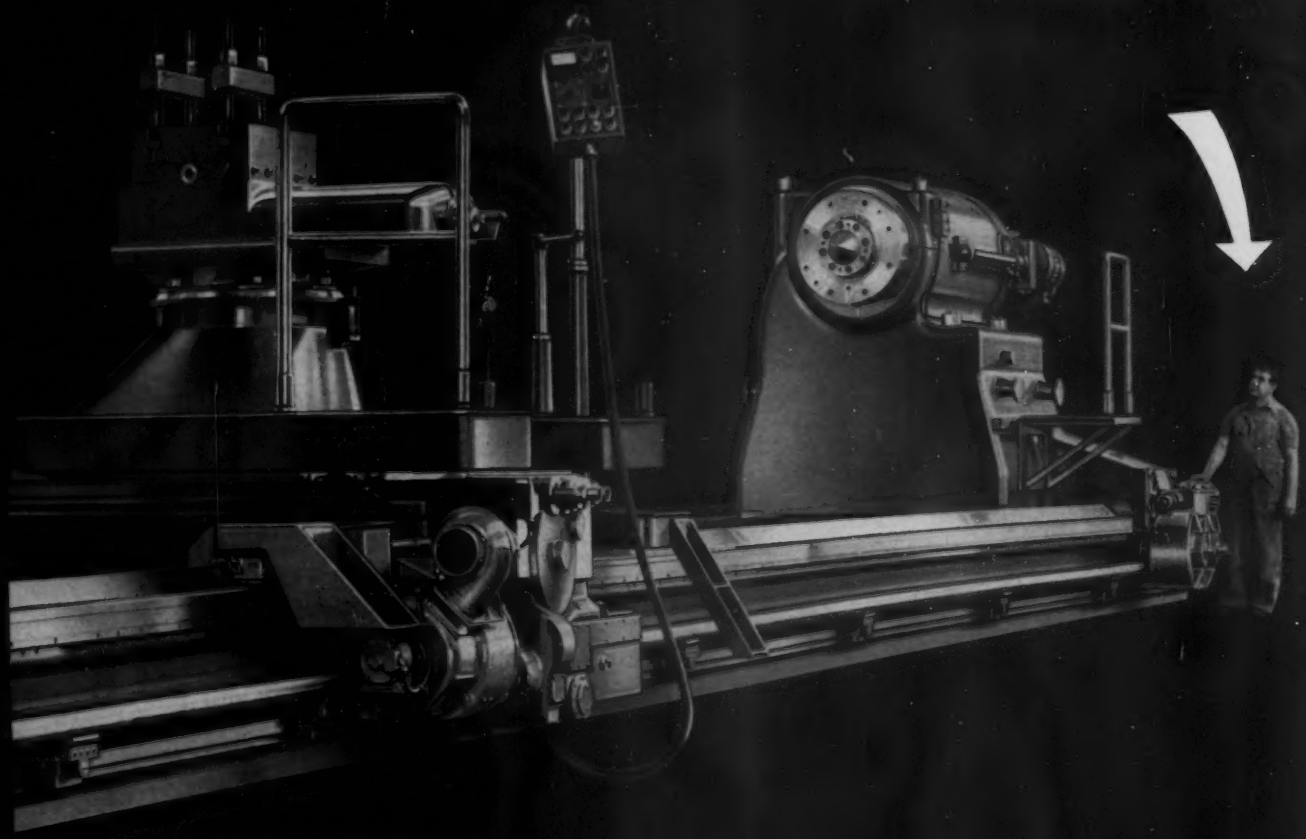
a half-
BETTS

million dollar lathe

. . . the heaviest and most powerful ever built in America!

Some highlights on the new 12 foot BETTS HEAVY DUTY LATHE:

- The head and tail stock centers alone (without steady rests) will support work pieces *weighing up to 250 tons!*
- The big super-precision spherical roller type spindle bearings are 36 *inches in diameter!*
- The lathe shown (60 foot centers) weighs 245 tons.
- The front way of the bed is nearly 3 feet wide.
- The taper attachment turns tapers *up to 14 feet long* in one setting!
- The head stock is built for a 250 HP driving motor.



Advertisement | CONSOLIDATED MACHINE TOOL CO.

more on the next page ▶

the 30 ton tail stock

Its huge live center revolves in precision roller bearings nearly two feet in diameter.

These lathes are big, but more than bigness is the quality of engineering thinking that goes into them.

For example, this big lathe is electronically controlled. The operator runs it at the cutting tools with his eyes on the cut. Infinitely variable feeds and speeds are on a portable panel at his finger tips and he can change them in fine increments *while the tools are cutting!* Power traverse is there, too. There are also such features as the adjustable spring loaded tail stock spindle that compensates for the elongation of the work piece as its temperature rises.

This is the kind of thinking that goes into Consolidated Machine Tools.

CONSOLIDATED MACHINE TOOL CO.

ROCHESTER, NEW YORK

CONSOLIDATED MACHINE TOOLS

A DIVISION OF FARREL-BIRMINGHAM CO., INC.

FB

NEW!

..LaSalle introduces another quality product!

LARGE HEXAGONS

available NOW! . . in cold-drawn steel bars (GRADE C 1018) . . sizes to 4"

Yes, you can now buy cold-drawn hexagon steel bars in sizes up to and including 4". Effective immediately, LaSalle offers 3¼", 3½", 3¾" and 4" diameter hexagons . . in addition to conventional sizes ranging from ⅛" to 3".

No longer is it necessary to resort to costly and time-consuming forging, milling or other machining to produce large-size hexagons.

And with *cold-drawn* large hexagons you naturally get the superior mechanical qualities inherent in cold-drawn steel bars. Ask your steel distributor for Large Hexagons by LaSalle.

La Salle STEEL CO.

the Most Complete Line of Carbon and Alloy Cold-Finished and Ground and Polished Steel Bars in America.

For additional detailed information, send for your copy of this helpful new data sheet, "Large Hexagons."

LA SALLE STEEL COMPANY
1436 150th Street
Hammond, Indiana

Please send me Helpful Data Bulletin No. 14 "Large Hexagons"

Name_____

Title_____

Company_____

Address_____

City_____ Zone____ State_____

This CINCINNATI...

1½" thick x 12'

This 15012 Series Cincinnati All-Steel Shear has a 36" gap and a 48" back gauge range.

Power for heavy cutting with accuracy and operating convenience are combined in this machine.

Modern features such as—Hydraulic Holddowns, Front Operated Power Back Gauge, Hinged Back Gauge Angle, Automatic Pressure Lubrication, All-Steel Interlocked Construction, Forged Alloy Steel Eccentric Shaft—all contribute to an outstanding performance with low maintenance and high accuracy.

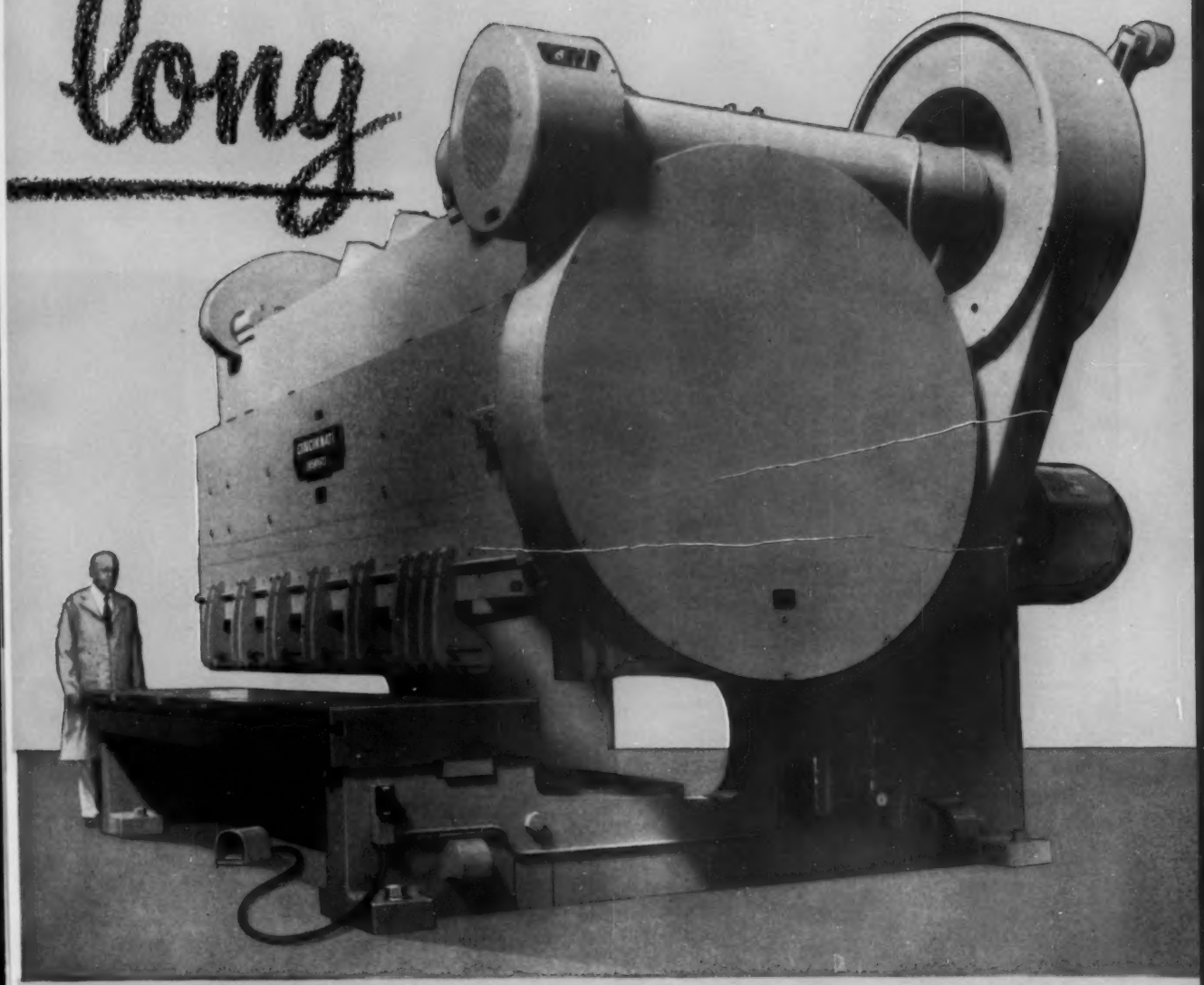
Write for Catalog S-7.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

shears steel plate

long



See your Cincinnati Representative for either Heavy or Light Shearing Applications.

do you want low-cost corrosion or contamination

Acetone • Borax • Calcium Carbide • Calcium Carbonate • Calcium Chloride (Flake) •
Ethyl Acetate • Ethyl Alcohol • Ethylene Glycol • Glycerine • Insecticide Concentrates •
Soap and Soap Lye • Soda Ash • Sodium Bicarbonate • Sodium Silicate •

CF&I

LECTRO-CLAD* Trademark

Nickel Plated Steel Plates will give it to you

Yes, you can get low-cost, yet effective protection against contamination and corrosion with all these chemicals...and many more!

Effective in heavy industrial applications where the corrosion rate does not exceed 0.0015 inches per year, CF&I LECTRO-CLAD Nickel Plated Steel Plates successfully combine the corrosion and contamination resistance of nickel and the economy and strength of carbon steel.

That's because CF&I LECTRO-CLAD is made by the Bart Process, which consists of electrodepositing a heavy layer of 99% pure nickel on a carbon steel plate. This process results in a permanent bond between the nickel and the steel base. The nickel plating is customarily supplied in the 8-10 mil range; however, it can be plated up to 15-20 mils, if specified.

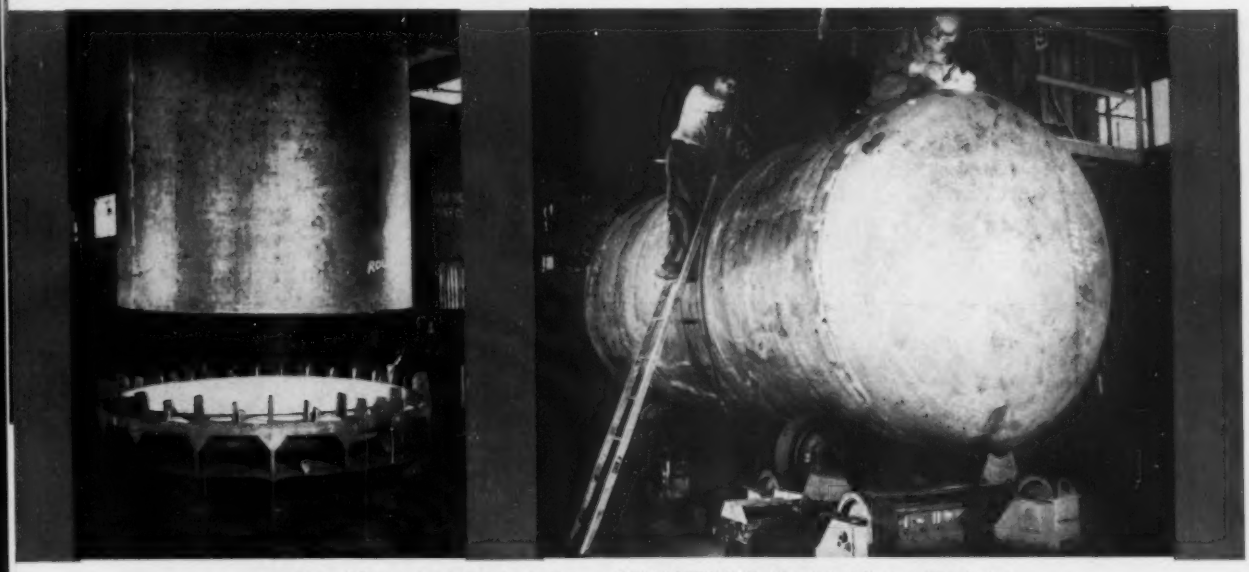
What's more, CF&I LECTRO-CLAD Nickel Plated Steel Plates are easily fabricated without costly special equipment. Just use regular shop equipment and bend it... weld it... roll it—the protective nickel layer will not check, spall or flake!

Ask our nearest sales office for the complete story on economical, effective, easy-to-fabricate CF&I LECTRO-CLAD Nickel Plated Steel Plate today. Wickwire Spencer Steel Division, The Colorado Fuel and Iron Corporation, P. O. Box 1951, Wilmington, Delaware.

CF&I LECTRO-CLAD Nickel Plated Steel Sheets, Pipe, Fittings and Heads are also available.

protection against with these chemicals?

Caustic Soda • Chlorinated Hydrocarbons • Cold Hydrofluoric Acid • Dibutyl Phthalate Methyl Alcohol • Petroleum Catalysts • Phenol • Potash • Resin Plasticizers • Salt Sodium Sulphate • Titanium Dioxide • Tricresyl Phosphate



Assembling a tank fabricated from CF&I LECTRO-CLAD Nickel Plated Steel Plates.
The heads have also been nickel electroplated by the Bart Process.

***Electroplated through the patented Bart Process** 3798

Claymont Steel Products

CF&I

Products of Wickwire Spencer Steel Division • The Colorado Fuel and Iron Corporation

Abilene • Albuquerque • Amarillo • Atlanta • Billings • Boise • Boston • Buffalo • Butte • Casper • Chicago • Denver • Detroit • El Paso • Ft. Worth • Houston • Lincoln (Neb.) • Los Angeles New Orleans • New York • Oakland • Odessa • Oklahoma City • Philadelphia • Phoenix • Portland • Pueblo • Salt Lake City • San Francisco • Seattle • Spokane • Tulsa • Wichita
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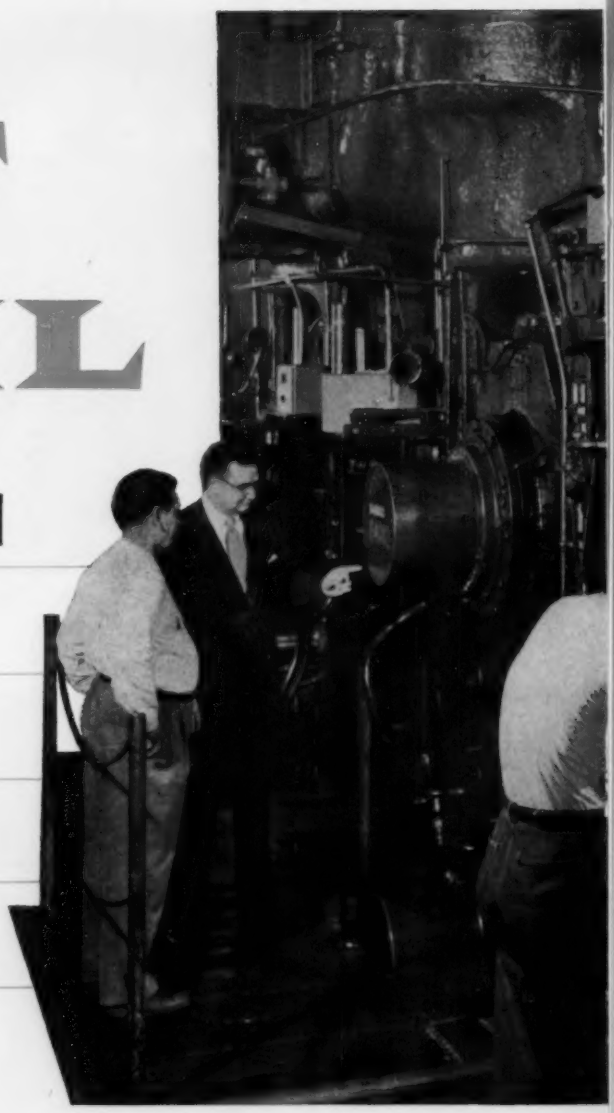
OTHER CLAYMONT PRODUCTS

Stainless-Clad Plates • Manhole Fittings and Covers • Large Diameter Welded Steel Pipe Flame Cut Steel Plate Shapes • Flanged and Dished Heads • Carbon and Alloy Steel Plates

"GULF I-C OIL

has a fine performance record in our mill — 14 years without a bearing failure attributable to lubrication"



*says one of the larger brass mills in the United States**

The Morgoil bearings on the 4-high United Tandem mill at this plant have been lubricated with Gulf I-C Oil since it first went into operation in 1942. And there have been no bearing failures attributable to lubrication up to this time.

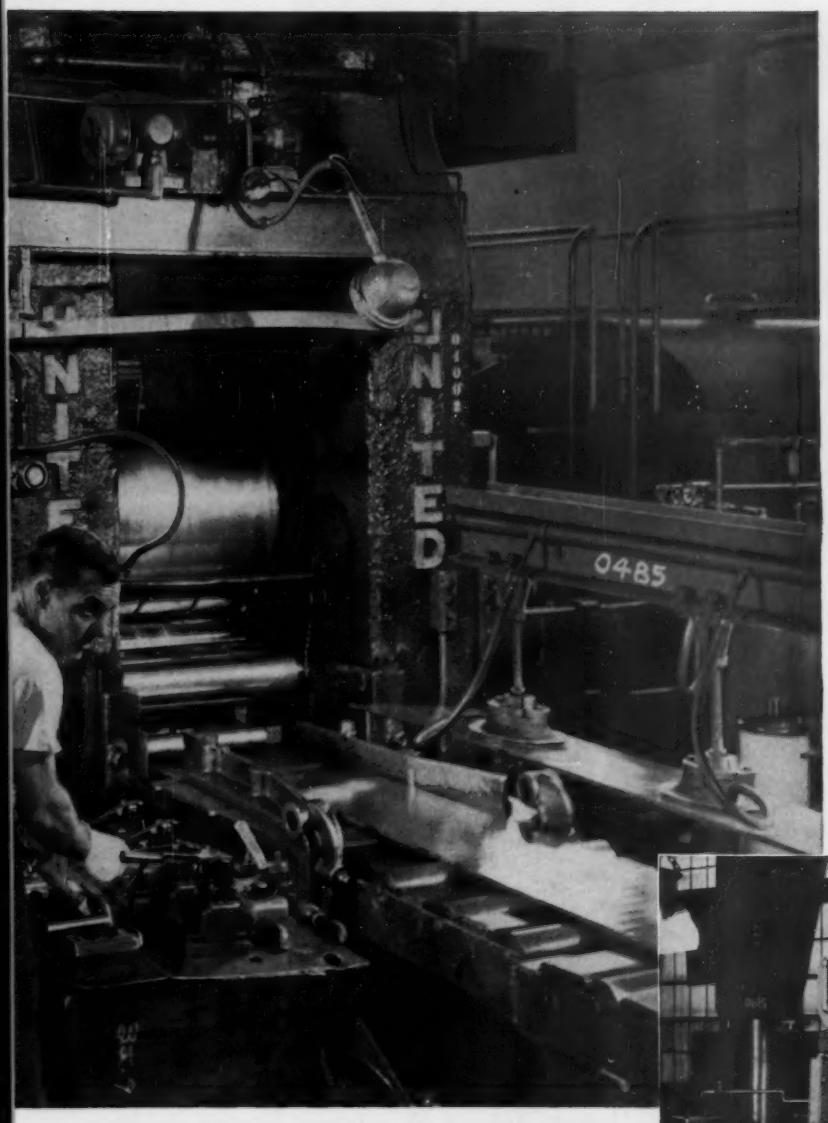
These bearings require the best possible lubrication to withstand heavy loads over a long period of time when rolling heavy brass strip. Gulf I-C Oil provides the effective lubrication that is needed. This stable oil has excellent water-separating characteristics and resists sludge formation. These important advantages — plus outstanding lubricating qualities — contribute to continuous operation and lower maintenance costs.

Another outstanding Gulf product, Gulf Stainless Metal Oil, was selected as the roll oil by this company because it gives the desired finish.

To get the many benefits possible with these quality products, and for expert help on other phases of improved lubrication, call in a Gulf Sales Engineer. Write, wire, or phone your nearest Gulf office.

Gulf Oil Corporation · Gulf Refining Company
1822 Gulf Building, Pittsburgh 30, Pa.

**Name furnished upon request.*

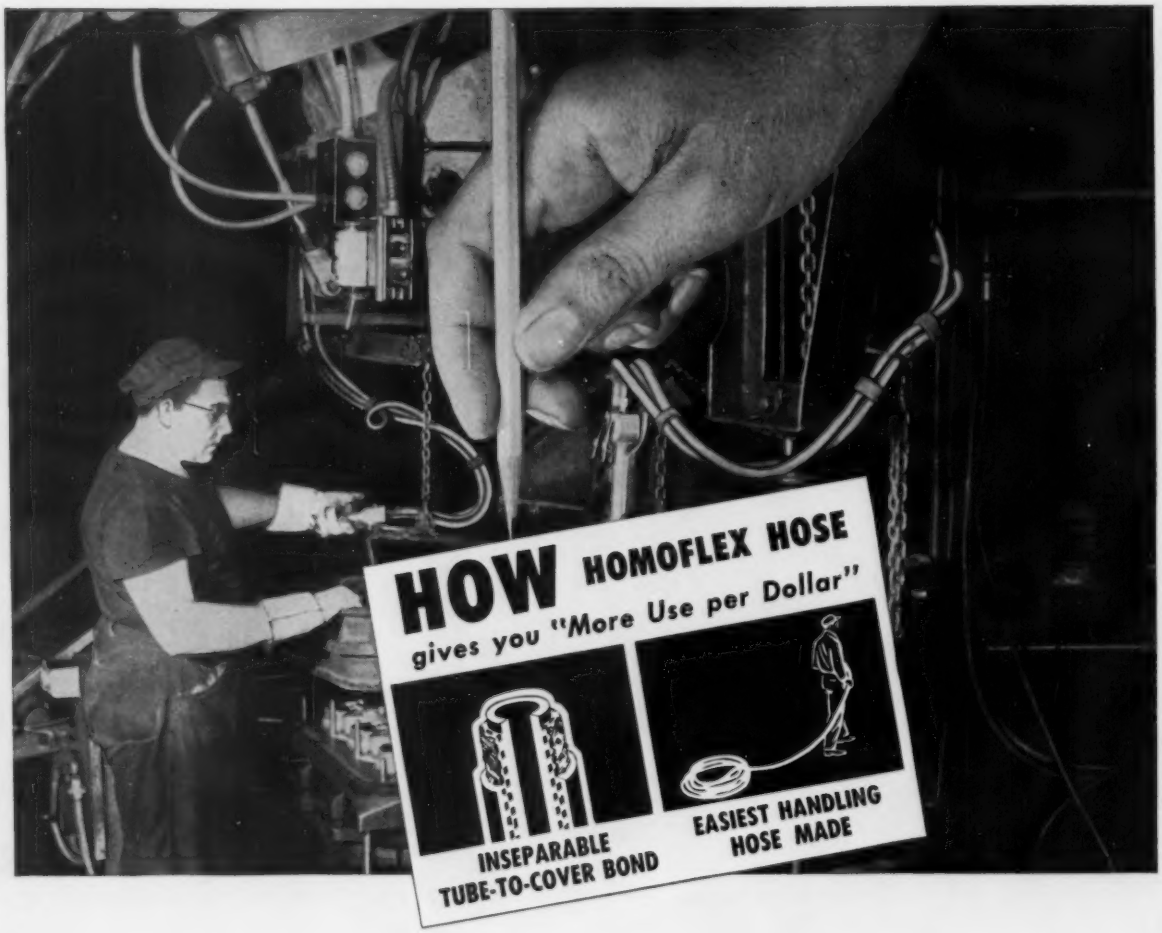


The Morgoil bearings in this 4-high United Tandem mill are lubricated with Gulf I-C Oil and have been for 14 years.

Single Stand 2-high rolling mill where Gulf I-C Oil contributes to smooth production. The roll oil in use is Gulf Stainless Metal Oil.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS



This Rugged Hose Handles Like a Rope!

Strong enough to stand up under the toughest job conditions, Homoflex Hose is light in weight and as flexible as a rope. It's the easiest handling hose made for use with air, water, and other fluids and gases! The exclusive Homoflex construction increases hose life, too . . . assuring you "More Use per Dollar" for every length you buy.

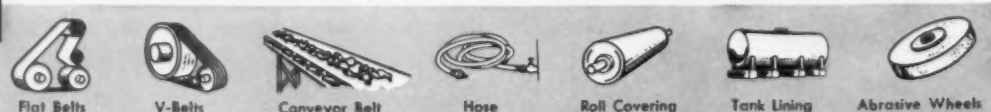
Homoflex Hose has no pre-set twist. It is mandrel-made to coil and uncoil freely in any direction without kinking. This eliminates the strain that could otherwise lead to costly internal damage and hose rupture. An exclusive process creates a homogeneous, inseparable tube, strength member and cover bond that combines maximum flexibility with rugged strength and durability. Homoflex Hose reduces hose costs because its easier handling features enable workers to get more work done . . . and because it lasts longer. Couplings are easier to fit, too, because Homoflex Hose maintains uniform inside diameters.

Ask your R/M representative about easy handling Homoflex Hose for your operations. He'll also tell you how other types of R/M Hose for general and special purposes do a better job, longer . . . give you "More Use per Dollar".

RM 647

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



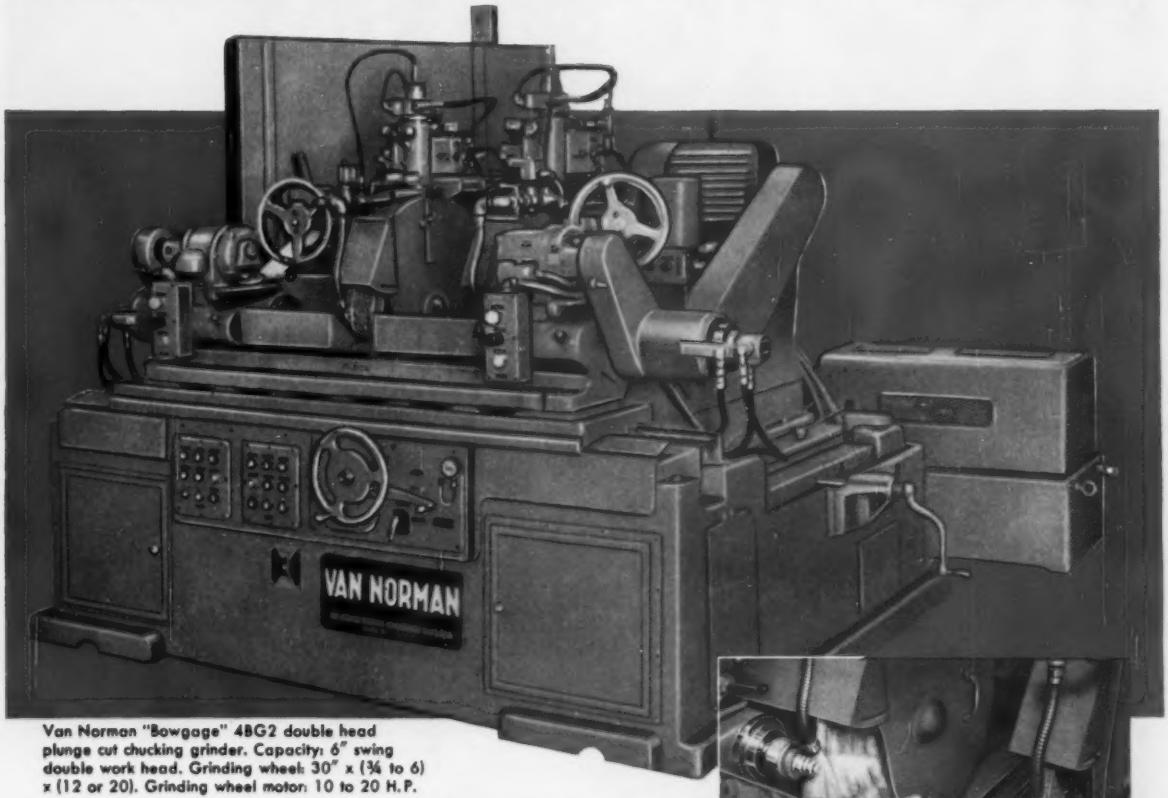
Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Brake Linings • Brake Blocks • Clutch Facings Asbestos Textiles • Packings • Engineered Plastic, and Sintered Metal Products • Laundry Pads and Covers • Bowling Balls

VAN NORMAN

"Engineered for the Job"

"Bowgage" Production Grinders

Out Perform Them All for Speed, Accuracy and Low Cost Grinding



Van Norman "Bowgage" 4BG2 double head plunge cut chucking grinder. Capacity: 6" swing double work head. Grinding wheel: 30" x (¾ to 6) x (12 or 20). Grinding wheel motor: 10 to 20 H.P.

Grinding Universal joint flange on the Van Norman "Bowgage" 4BG2 .022 stock removal — 1.625 diam. — 15 R.M.S. — Maximum 480 pieces per hour.

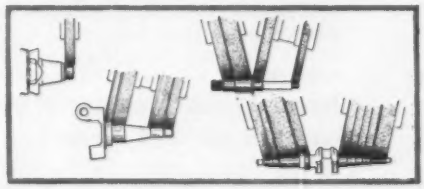
You just can't beat Van Norman "Bowgage" Production Grinders for fast, economical mass production. These massive, rugged grinders are "*engineered for the job*" to meet your exacting requirements.

Illustrated is the Van Norman "Bowgage" 4BG2 double head plunge cut grinder designed and built for a major automotive manufacturer. Day after day, this 14.8 ton rugged brute and other single and double head grinders are showing substantial savings by keeping production up and costs down.

If you have a mass production grinding problem, let Van Norman Engineers help you solve it. Write for their help, today.

Don't wait . . . for extra profits install a Van Norman Machine now! They are available on five purchase plans — Outright sale . . . Purchase on conditional sales contract up to five years . . . Pay as you depreciate . . . Straight lease . . . Lease with option to buy. See your dealer or write Van Norman Company. Lease and Conditional Sales Contracts not available to Export.

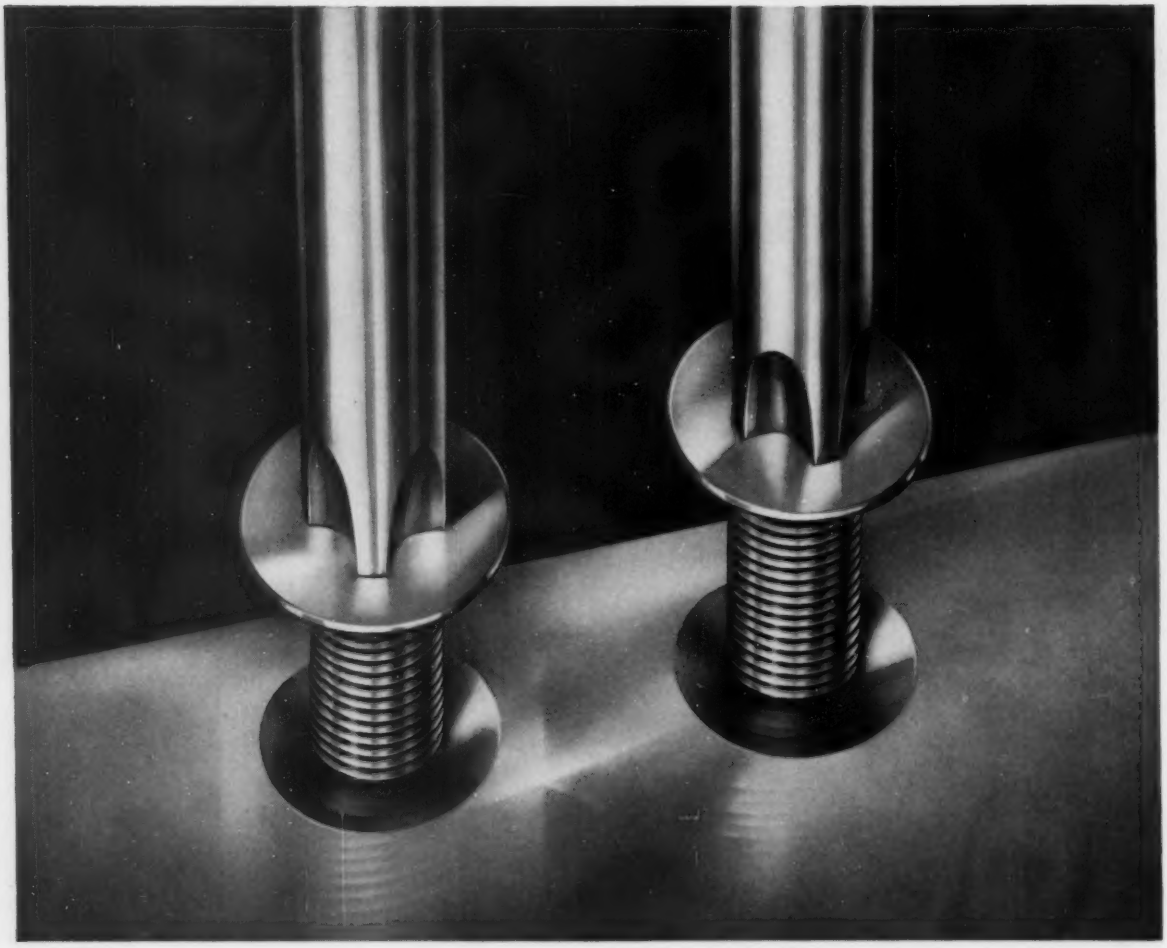
Sketches illustrate actual grinding applications performed for users of single and double head plunge cut special purpose grinding machines.



VAN NORMAN MACHINE COMPANY

***Manufacturers of* — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.**

SPRINGFIELD 7, MASSACHUSETTS



They may Look the same but...

American is the name!

In your actual cost of modern fasteners are four things:

1. PRICE **3. QUALITY**
2. SERVICE **4. RESEARCH**

It is possible, as prices fluctuate, there may be places you can get a price differential at the moment. But no one gives you more of all four plus features than American.

American gives you more of all four

Certainly in service, where precision American deliveries keep any production line on schedule — like an automotive manufacturer who uses more than 600 million American Phillips fasteners a year.

Certainly in quality where qualitative checks at American are unmatched in the industry in such key areas as raw material identification and evaluation.

Certainly in research that has developed not only the Phillips Head fastener, but devised a fastener for an appliance manufacturer that cut fastening costs more than 50%.

Nowhere will you find more of the four basic product features you want than from American — price, service, quality, research.

Like to know more about how this can save you important money? Then write:

American!

AMERICAN SCREW CO. • WILLIMANTIC, CONN.
NORRISTOWN, PA. • CHICAGO, ILL. • DETROIT, MICHIGAN

The Best

Standardized gearing in stock . . .

are the easiest

housing sub-assemblies in stock . . .

to get

and standardized pinions in stock . . .

mean faster deliveries from stock!

FOOTE BROS.
LINE-O-POWER SPEED REDUCERS

Standardized interchangeable gearing – by Foote Bros. – lets you specify and get the particular reducer you want, in the quantities you need, direct from stock! Duti-Rated Lifetime Gearing in a complete range of interchangeable sizes, ratios and capacities are stocked and ready for assembly. Capacities range up to 200 H. P., ratios to over 2700 to 1. Standard foot and flange type cast housings are stocked, too, for straight or right angle drives. The drives you want are assembled from stock components and shipped as soon as your order is received. For a complete index to the almost endless variety of Line-O-Power reducers immediately available, write for your copy of the Line-O-Power catalog today. See for yourself how you can get more for your drive dollar . . . faster!

This trademark stands for the finest industrial gearing made!

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FOOTE BROS.

Better Power Transmission Through Better Gears

FOOTE BROS. GEAR AND MACHINE CORPORATION
4545 South Western Boulevard, Department M, Chicago 9, Illinois

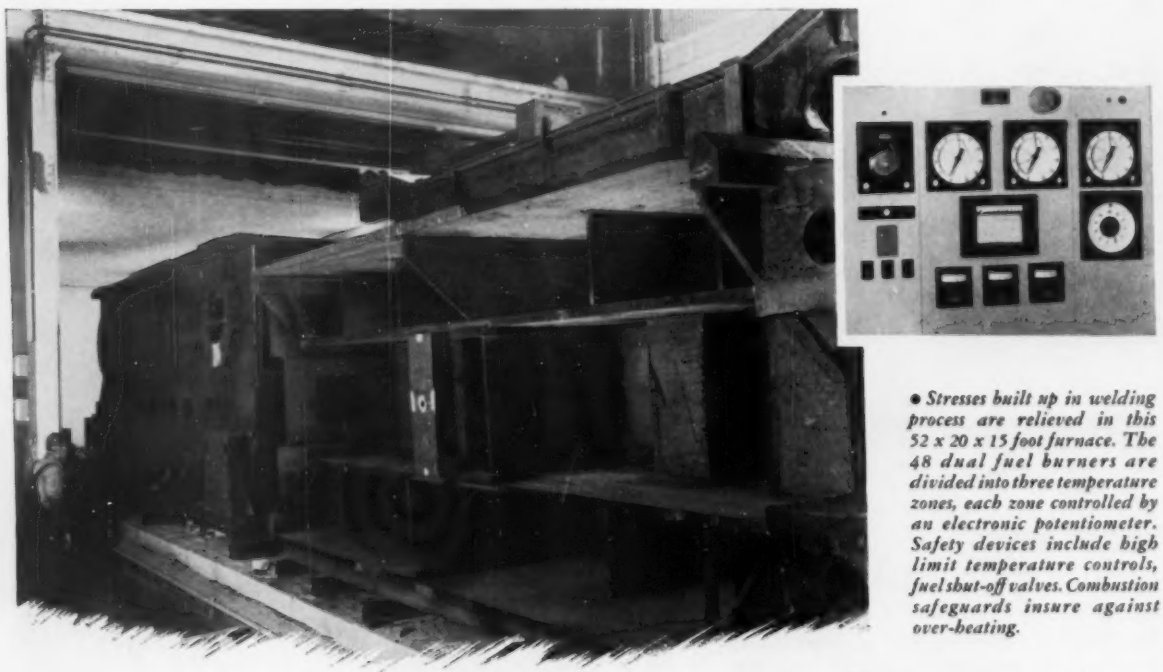
How Morgan stress relieving insures maximum design strength

• STRESS RELIEVING is one of many reasons why Morgan cranes provide longer, completely safe service under *any* operating conditions. Trolley frames, end carriages, trucks, drums, bearing caps, stripper barrels and rams, pit rams . . . all are stress relieved in Morgan's huge furnace capable of handling loads up to 250,000 pounds.

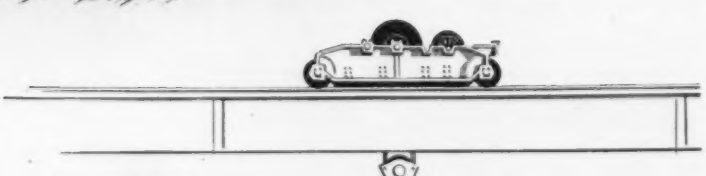
Morgan's stress relief furnace, one of the largest in the world, can raise temperatures 200 degrees Fahrenheit per hour up to 1750° F.

Stress relieving is still another example of the advanced design and construction features that make Morgan cranes the best in the business.

Performance records prove that Morgan cranes cost less to operate and maintain. Let our representative show you how to save the most by buying the best . . . Morgan!



• Stresses built up in welding process are relieved in this 52 x 20 x 15 foot furnace. The 48 dual fuel burners are divided into three temperature zones, each zone controlled by an electronic potentiometer. Safety devices include high limit temperature controls, fuel shut-off valves. Combustion safeguards insure against over-heating.



The Morgan Engineering Company, founded in 1868, manufactures overhead electric traveling cranes, gantry cranes, open hearth special cranes, plate mills, blooming mills, structural mills, shears, saws, and auxiliary equipment.

THE MORGAN ENGINEERING CO. *Alliance, Ohio*

From its Wide Variety of Qualities and Sizes

SANDVIK CAN PINPOINT THE SPRING STEEL

...that fits your purpose

Sandvik has both the specialized experience and the special-purpose strip steels to solve almost any spring steel problem.

You can call on Sandvik's knowledge of special spring steel applications for assistance in determining the type of steel required. Then, from its extensive range of qualities, finishes and sizes, Sandvik can usually pinpoint a steel that's practically "custom-tailored" for you.

For applications which require special physical properties, high fatigue life, fine surface finish, accurate and uniform gauge, check with Sandvik.

You can get Sandvik cold rolled specialty strip steels:

- **In special analyses for specific applications.**
- **Precision-rolled in thicknesses to fit your requirements.**
- **In straight carbon and alloy grades.**
- **Annealed, unannealed or hardened and tempered.**
- **Polished bright, yellow or blue.**
- **With square, round or dressed edges.**
- **Wide range of sizes in stock—or slit to your specifications.**

Ask your nearest Sandvik office for further information or technical assistance.

Write for this Free, complete Sandvik catalog.

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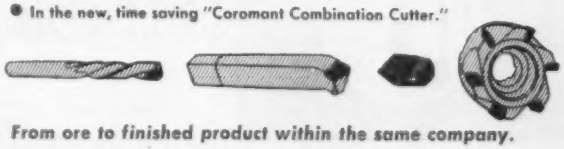
Sandvik Quality Steels

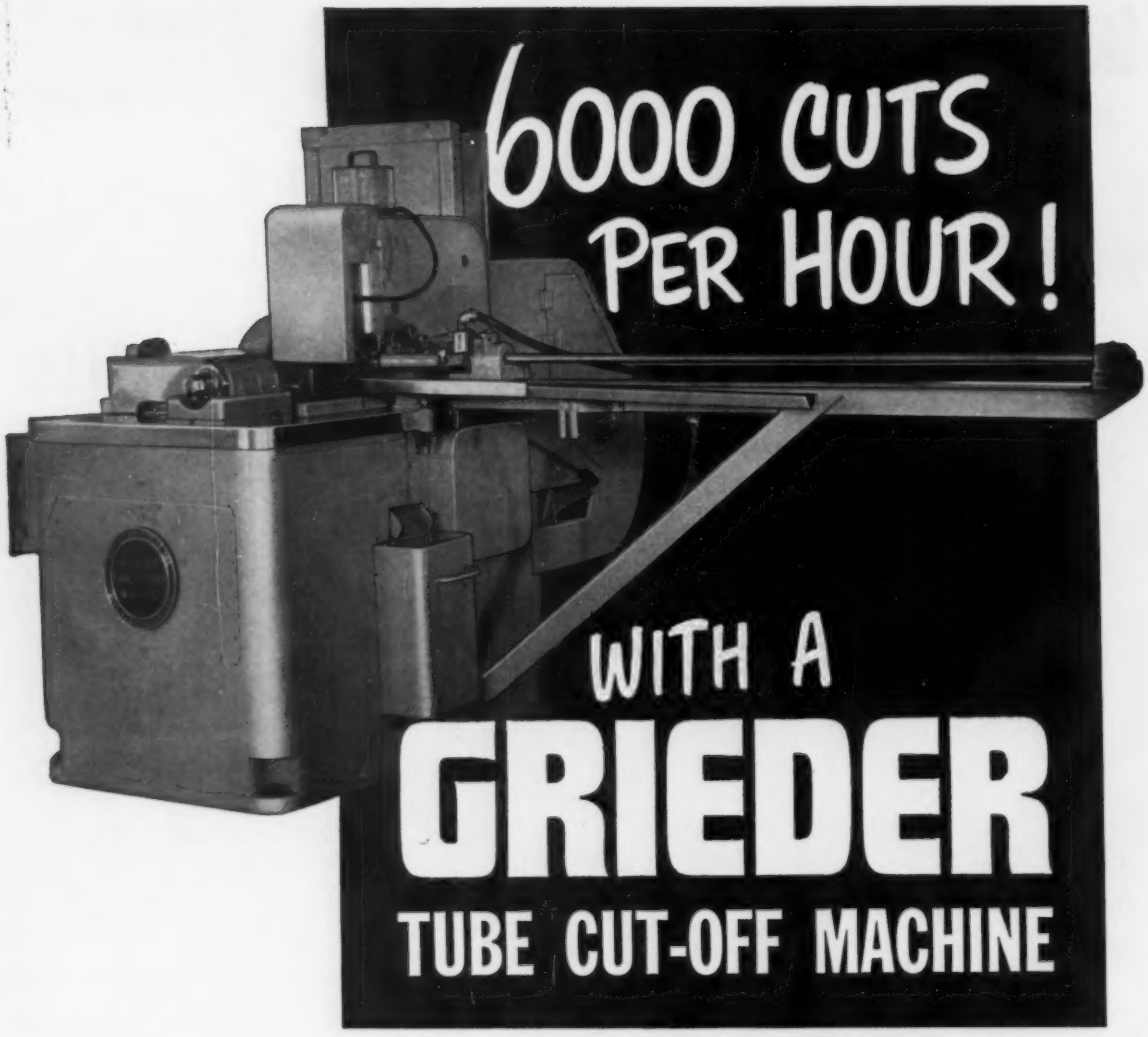
SS-111

SANDVIK *Coromant* CARBIDE TIPPED TOOLS AND BLANKS

- **In a wide variety of tools and blanks from stock — including many shapes and designs which have been considered "specials" before.**
- **In all standard grades with improved performance to suit a wide range of applications.**
- **Grades permanently color-identified on the end of tool shank and etched in the carbide blanks.**
- **In the new, time saving "Coromant Combination Cutter."**

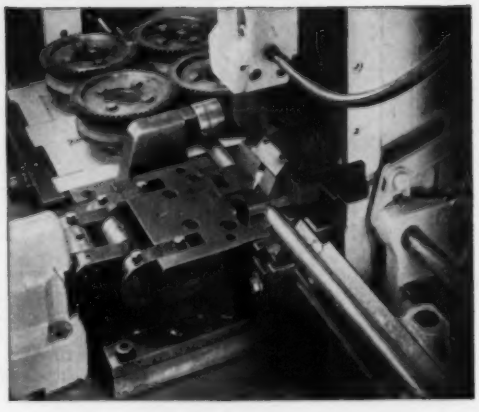


From ore to finished product within the same company.



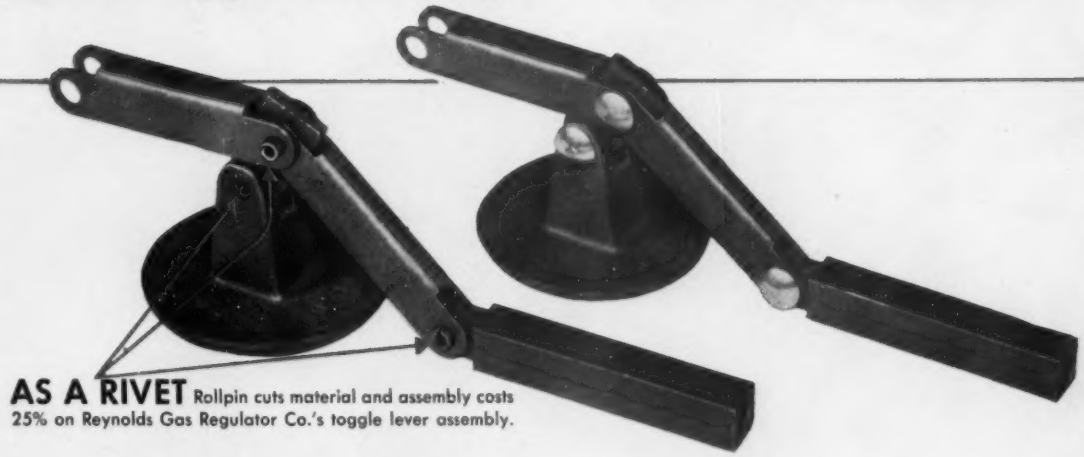
NO DISTORTION... MINIMUM BURR...
ACCURACY WITHIN .002"...
CUTS ANY SHAPE...

Cut steel tubing at the amazing speed of 6000 cuts per hour. The Grieder Tube Cut-Off Machine features a heavy duty air operated combination clutch and brake unit that allows continuous operation at this terrific rate of production. Fully automatic . . . Rate of feed: 600 feet per minute . . . True cutting. Get full information, multiply your tubing production, reduce costs, write *today*.

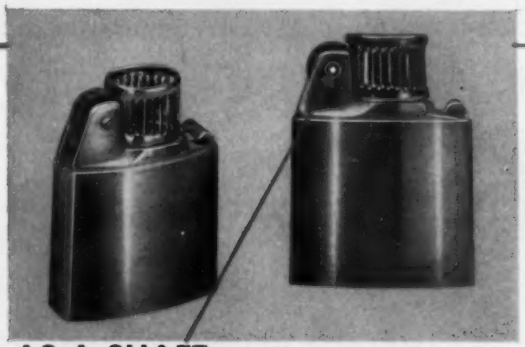


GRIEDER INDUSTRIES, INC.
BOWLING GREEN, OHIO

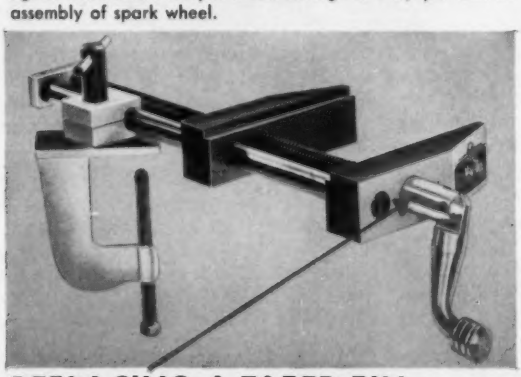
Three typical Rollpin cost reductions



AS A RIVET Rollpin cuts material and assembly costs 25% on Reynolds Gas Regulator Co.'s toggle lever assembly.



AS A SHAFT before and after shot of this Ronson lighter shows how Rollpin made savings of 1½¢ per unit in assembly of spark wheel.



REPLACING A TAPER PIN Rollpin saves 24¢ labor cost on each of American Machine and Foundry's MITY-7-VISES. Eliminates tool cost caused by breakage of small taper reamers.

ESNA® TRADE MARK

ROLLPIN TRADEMARK

Where can you use this simple fastener?

If you use locating dowels, hinge pins, rivets, set screws—or straight, knurled, tapered or cotter type pins—Rollpin can cut your production and maintenance costs as it does in every class of industry. Rollpin is a slotted tubular steel pin with chamfered ends that drives easily into standard holes, compressing as driven. Its spring action locks it in place—withstanding impact loading, stress reversals and severe vibration. No threading, peening or precision drilling needed. Rollpin is readily removable and can be re-used in the same hole.

ELASTIC STOP NUT CORPORATION OF AMERICA

MAIL COUPON FOR DESIGN INFORMATION

Elastic Stop Nut Corporation of America
Dept. R38-477, 2330 Vauxhall Road, Union, N. J.

Please send the following fastener information:

☐ Rollpin samples
☐ Rollpin bulletin
☐ Here is a drawing of our product. What self-locking fastener would you suggest?

Name_____ Title_____

Firm_____

Street_____ Zone____ State_____

ALLIS-CHALMERS FORK TRUCKS Give Over 6000 Trouble-Free Hours Of Operation At Neenah Foundry Co.

Neenah Foundry's chief mechanic, shown here at work on one of the Allis-Chalmers trucks with one of his men, has this to say about the superiority of this equipment: "They are tougher than the other trucks and require less maintenance. I like the overhead valves and wet cylinder sleeves. I think one reason the Allis-Chalmers trucks have out-performed the others is because they are easier to clean and service. I'm glad to see that they are replacing the old trucks with Allis-Chalmers trucks. This is going to make our job a lot easier."

For three years, Allis-Chalmers Fork Lift Trucks have been a part of a seventeen-truck fleet in operation at Neenah Foundry Company, a progressive, cost-conscious organization at Neenah, Wisconsin. During this time, the 4,000-pound capacity Allis-Chalmers trucks have been used continuously for handling heavy castings 10 to 12 hours per day. Yet because of their unusually sturdy construction, they have operated with only normal maintenance for well over **6,000 hours.** The rugged engines have required only normal tune-ups and oil changes, and are still in perfect running condition.

Moreover, the Allis-Chalmers trucks are doing a more efficient handling job, are operating on much less fuel, and are all but eliminating truck downtime and repair costs compared to the company's other equipment. **Brake lining and drum wear,** for example, always a serious problem because of fine foundry grit and sand, have been negligible—even after thousands of hours of operation.

Service and performance such as this—the rule, not the exception with Allis-Chalmers Lift Trucks—have made this equipment the choice of important foundries throughout the country.

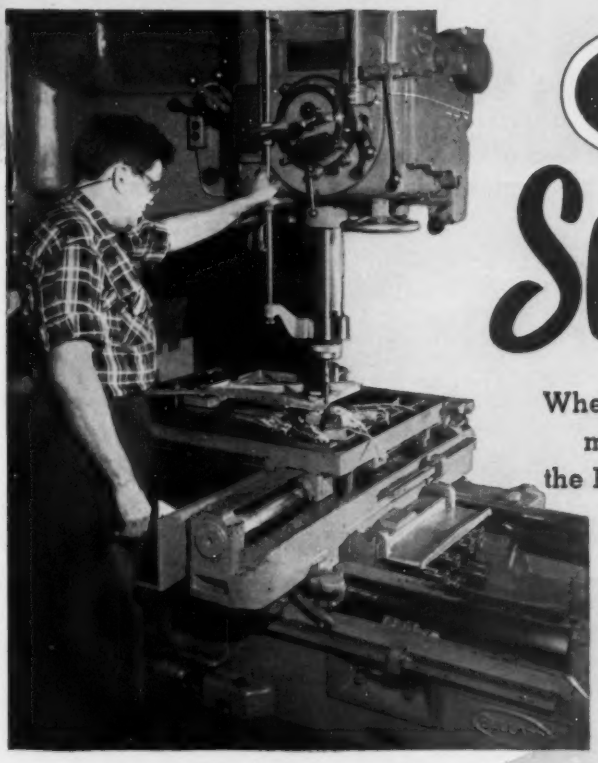
Write today for your free copy of our 36-page, fact-filled booklet which explains in detail the many exclusive features making Allis-Chalmers Fork Lift Trucks industry's preference everywhere. BH-1

ALLIS-CHALMERS, BUDA DIVISION, MILWAUKEE 1, WISCONSIN

ALLIS-CHALMERS

ACCURATE LOCATING PERFORMANCE

Acclaimed By Customer with . . .



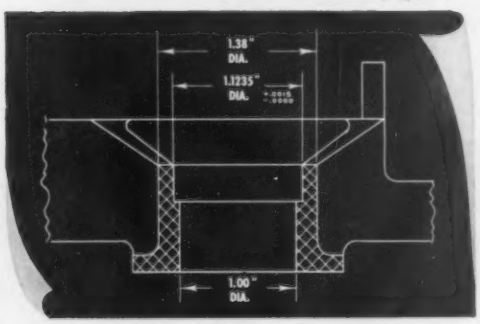
BULLARD Spacer Table

Where close tolerances must be maintained on repetitive pieces the Bullard Spacer Table is a "natural"

"The machine is simple to operate. We have found the Bullard Spacer Table very useful in our work", says a foreman at San Diego Division of Convair, "It eliminates the necessity of zeroing to a set position. And there is no chance for error, which is important when you make accurate parts for airplanes."

This same accuracy to close tolerances can be applied to your drilling, reaming or tapping operations without the high cost of jigs or fixtures.

Identical machining operations on each of three holes for battery carriage are performed on the Bullard Spacer Table.

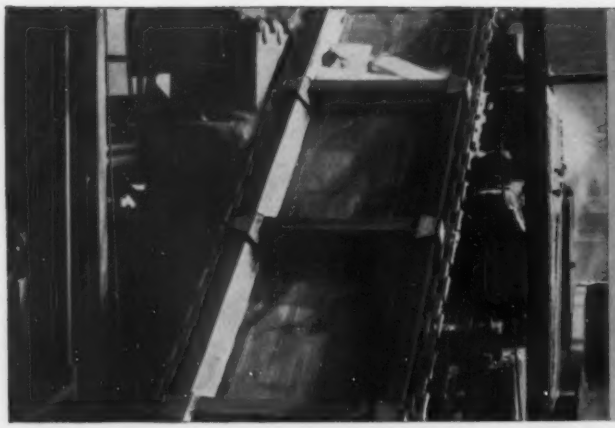


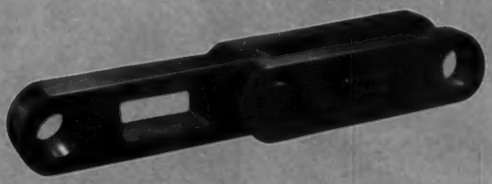
OPERATION DATA

OPERATION	SET-UP TIME	UNIT TIME
Drill 1" dia.	.70	.2066
Counterbore 1.1235" dia. at 1.000 dia. .350" deep	.25	.0566
Face 1.38" dia.	.25	.0356

CALL YOUR NEAREST BULLARD REPRESENTATIVE OR WRITE FOR SPACER TABLE CATALOG TO

THE **BULLARD** COMPANY
BRIDGEPORT 2, CONNECTICUT

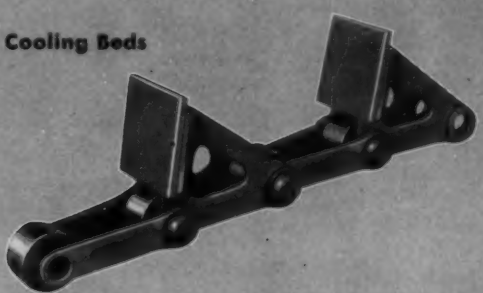




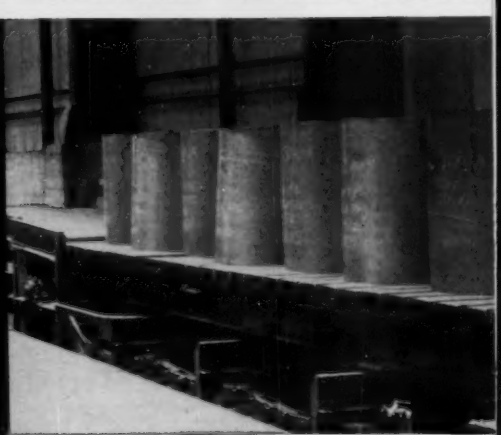
Crop Conveyors

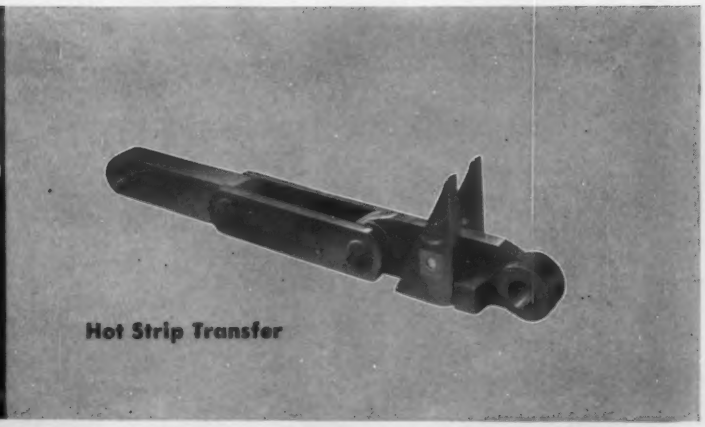
JEFFREY steel mill chains are built for rigorous, continuous operation

Cooling Beds

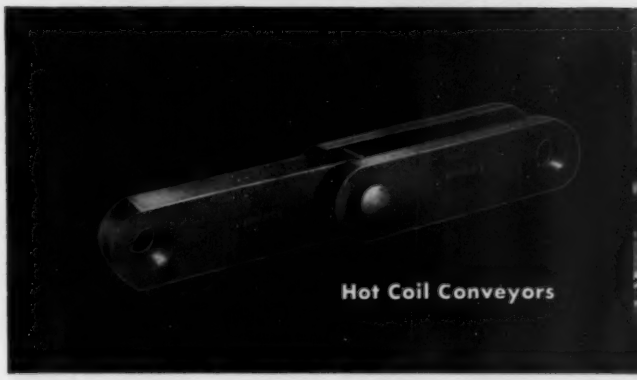


Sheet Coil Conveyors





Hot Strip Transfer



Hot Coil Conveyors

Draw Bench Chain

Jeffrey chains are engineered and built to withstand the grueling services encountered in the steel industry. Our manufacturing standards are high. Machining, heat treatment, assembly and inspection are closely controlled to insure that these products meet Jeffrey's high quality standards.

Metals are chosen for maximum strength with minimum weight. Extra metal is designed into chain where wear conditions are most severe.

There's a type of Jeffrey chain and attachment to suit every steel mill requirement. Choose Jeffrey chain for smooth, economical operation and long life.

Jeffrey chains are carried in stock by distributors all over the country. The Jeffrey Manufacturing Company, Columbus 16, Ohio.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT
TRANSMISSION MACHINERY • CONTRACT MANUFACTURING

A Cheaper, Better, Faster Test
Detects Tiny Flaws in Tubing
Quality Unit Sees 100% of Tube
Nondestructive Testing of Stainless Tubing at Production Speeds
High-Speed Unit Performs Three-Way Inspection
Machine Signals Flaws In Steel With a "Beep"
NEW PRODUCTS

HOTTEST NEWS IN THE INDUSTRY!

Latest quality control test assures better-than-ever *Carpenter* Stainless Tubing

The news is really getting around that Carpenter Stainless Tubing now undergoes the most exacting and thorough non-destructive test ever developed for quality control of austenitic types. Variations in composition, gauge, sub-surface and surface conditions are detected at production speeds. Flaws not revealed by hydrostatic tests are brought to light as this new testing device critically scans the entire I.D. and O.D. periphery of the tubing.

This notable advance in quality control means that Carpenter Stainless Tubing is now, more than ever, your best buy for life-long, trouble-free service. So, whenever you need stainless tubing for pressure or mechanical applications, give your equipment the advantage of Carpenter quality . . . more companies are. Call on your nearby Carpenter Distributor or Representative for any additional information you desire, or write to . . .

MEMBER

The Carpenter Steel Company, Alloy Tube Division, Union, N. J.

Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

Carpenter

Stainless Tubing & Pipe

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Scovill Mfg. Co., (Wire, Rod, Bar) Chicago
United States Steel Supply Div., *Chicago
Benjamin Wolff & Co., *Chicago
INDIANA
W. J. Holliday & Co., *Indianapolis
Kaslo Steel Corporation, Elkhart
United States Aluminum Co., (Architectural only) *South Bend
KANSAS
Industrial Metals, Inc., Wichita
KENTUCKY
Cobb Sales Co., (Wire, Rod, Bar) *Louisville
Southern States Iron Roofing Co., Louisville
MARYLAND
Clendenin Bros., Inc., *Baltimore
MASSACHUSETTS
Jos. T. Ryerson & Son., Inc., Boston
MICHIGAN
Kaslo Steel Corporation, *Detroit and Grand Rapids
McDonnell Bros., Inc., (Architectural only) *Detroit
Meier Brass & Aluminum Co., *Detroit
MINNESOTA
MacArthur Co., (Architectural only), *St. Paul
United States Steel Supply Div., St. Paul
Vincent Brass & Aluminum Co., *Minneapolis
MISSOURI
Industrial Metals, Inc., *Kansas City and St. Louis
United States Steel Supply Div., St. Louis
NEW JERSEY
Edgcomb Steel and Aluminum Corp., *Hillside
Peter A. Frasse & Co., Lyndhurst
Mapes & Sprowl Steel Co., *Union
Ray Millar, Inc., (Tubing & Pipe) *Newark
NEW YORK
J. G. Braun Co., (Architectural only) New York
Edgcomb Steel and Aluminum Corp., Hillside, N. J.
Peter A. Frasse & Co., Buffalo, *New York, Rochester Syracuse
Mapes & Sprowl Steel Co., Union, N. J.
Ontario Metal Supply, Inc., (Wire, Rod, Bar) *Rochester
NORTH CAROLINA
Southern States Iron Roofing Co., Raleigh
OHIO
Kaslo Steel Corporation, Cleveland
Mutual Manufacturing & Supply Co., *Cincinnati
Varys Brothers, Inc., *Columbus
OREGON
Clingan & Fortier, Inc., Portland
PENNSYLVANIA
Athos Steel Service Co., *Philadelphia
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Merchant & Evans Co., *Philadelphia
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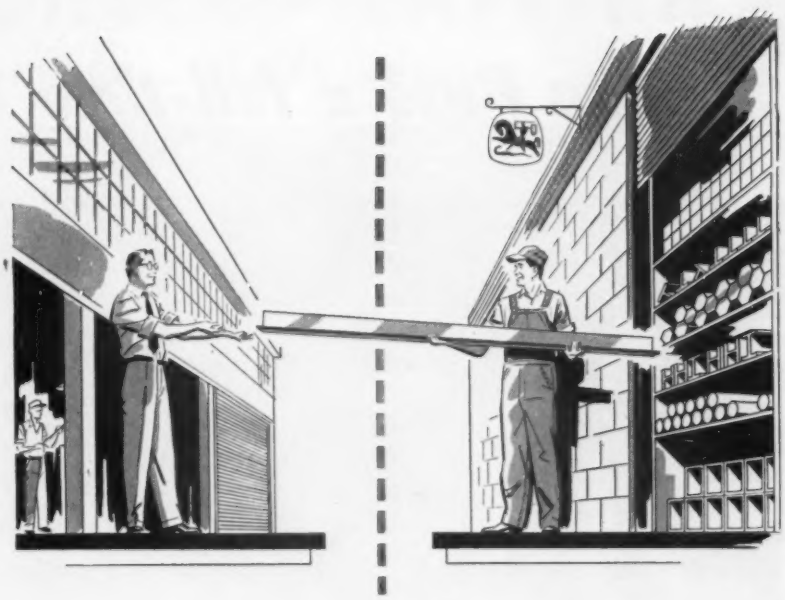

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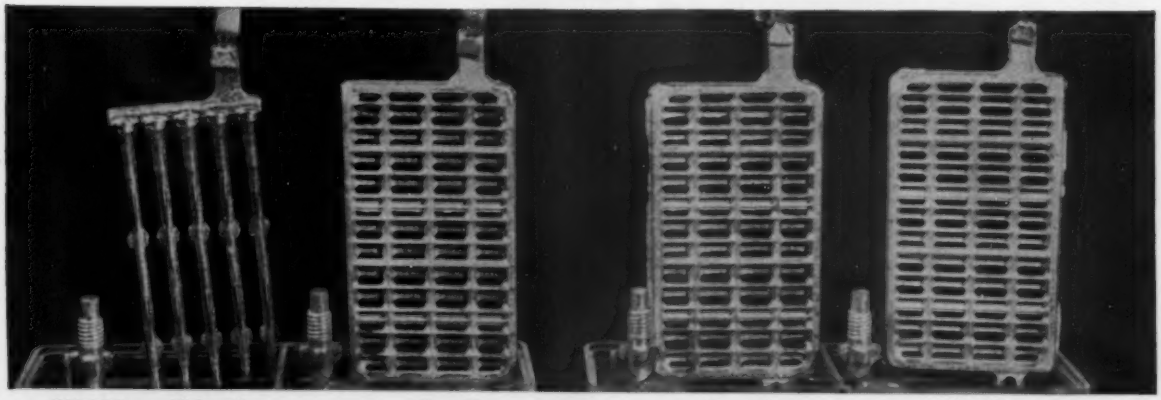
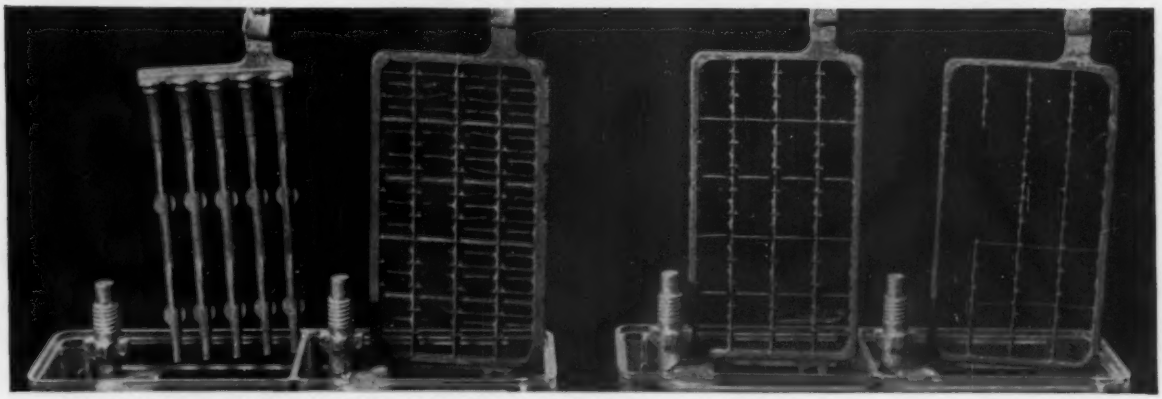


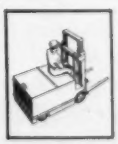
BEFORE: Silvium alloy — Alloy "A" — Alloy "B" — Alloy "C"



AFTER: Note how the Silvium grid resisted corrosion. Compare it with the other alloys.

Corrosion resistant SILVIUM prolongs battery life

BATTERY FOR ELECTRIC INDUSTRIAL TRUCK, Model TH. Fits snugly into space provided on truck. Has tubular construction of positive plates, Silvium grids, "Permanizad" negative plates, extra heavy connectors and all other Exide-Ironclad advantages that mean power to spare in heavy duty applications. Write for Bulletin 5161.



Reaching down deep into every Exide-Ironclad Battery are the fingers of Silvium alloy metal which form the grids of the famous Exide-Ironclad positive plates.

Silvium is a special alloy developed by Exide to resist corrosion and thus prolong battery life. For proof, Exide research engineers compared the performance of an Ironclad Silvium grid side by side with ordinary grids of other lead alloys. As the photographs above show, only Silvium came through the test without damaging corrosion—undiminished in size, unimpaired in strength. The other grids showed from moderate to severe corrosion.

Tests have proved that Silvium is not only more resistant to corrosion, but also a better conductor of electricity. Hence it both prolongs battery life and —because there's less internal battery resistance—more readily permits heavy drafts of power.

This special material is only one of the many exclusive features which have made Exide-Ironclad Batteries world famous for high capacity and long life. When you order batteries for heavy duty applications, or the equipment requiring such batteries, be sure to specify Exide-Ironclad. Write for detailed bulletin. Exide Industrial Division, The Electric Storage Battery Company, Phila. 2, Pa.

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No matter how small your order for special steel – you'll get it fast from Crucible. Every warehouse in Crucible's nationwide chain is geared to serve you promptly and efficiently. And you'll get not only *quality service* – but the *quality steels* that Crucible has been noted for, for generations.

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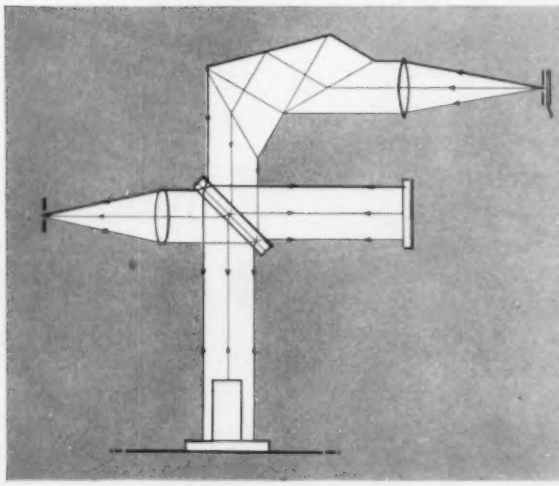
A NEW DIMENSIONAL AUDITING SERVICE FOR INDUSTRY



A Standards Laboratory—America's first commercial dimensional Standards Laboratory has just been dedicated in Dayton by The Sheffield Corporation.

The Eli Whitney Metrology* Laboratory was designed, constructed and equipped in accordance with the experience and standard practices of the great national laboratories of the United States, Great Britain, France and Germany. Thus, this new "Bureau of Standards" is qualified to supplement the work of the governmental laboratories in calibrating and certifying dimensional standards for industry.

Here, also, dimensional audits of precision mechanical components are made—audits not practicable except with the equipment and under the unmatched accurately controlled environment of this Standards Laboratory.

Here, overall dimensional control programs are developed for individual manufacturers—gage surveillance operations worked out in detail.

Here, key personnel responsible for dimensional control can study the philosophy of high precision—can get the feel of high precision equipment and become familiar with the procedures involved.

As to the Laboratory's name—what could be more fitting than to honor that illustrious pioneer, Eli Whitney?

It was Eli Whitney who taught the world the practical value of consistent dimensional precision as the essential of interchangeable parts manufacture.

It was Eli Whitney who thereby introduced our modern era of mass production and economic abundance.

It was Eli Whitney's achievements which demonstrated the blood relationship between dimensional precision and product quality.

The Eli Whitney Metrology Laboratory now takes its place as industry's ally in carrying on this tradition.

For a more comprehensive account of the facilities and capabilities of this unique Laboratory, write for Bulletin ML 1-56. Dept. 8.

Metrology—The science of measurement.

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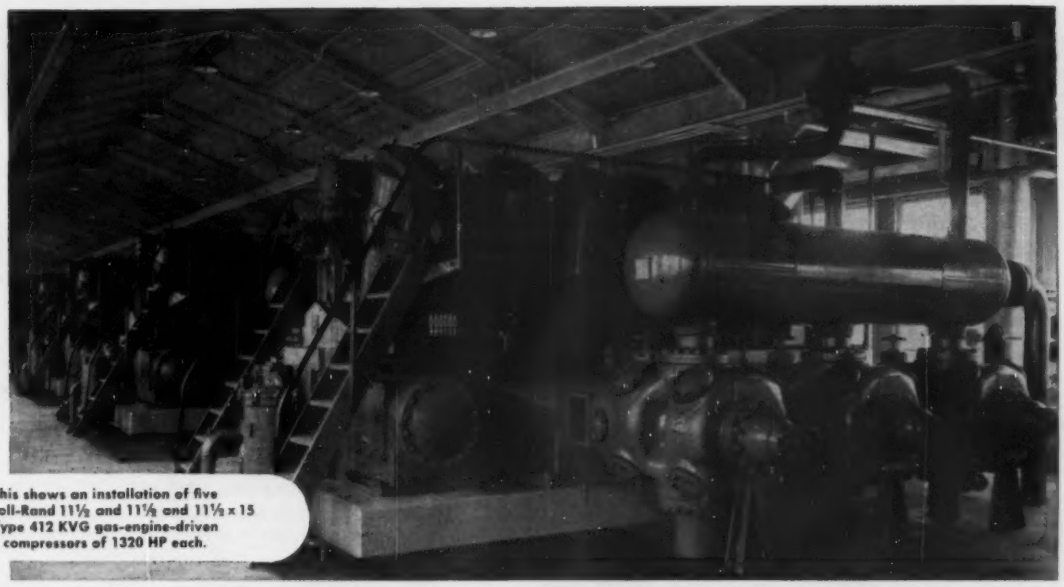
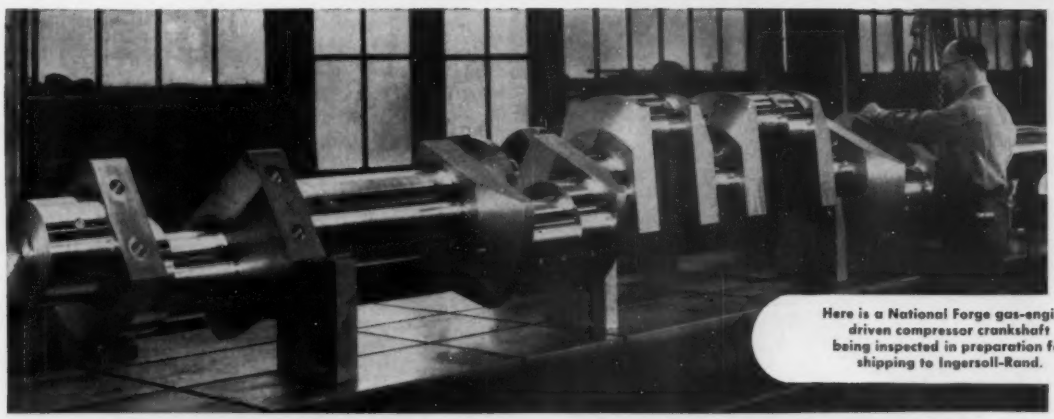


This shows an installation of five Ingersoll-Rand 11½ and 11½ x 15 Type 412 KVG gas-engine-driven compressors of 1320 HP each.



Here is a National Forge gas-engine-driven compressor crankshaft being inspected in preparation for shipping to Ingersoll-Rand.

INGERSOLL-RAND USE NATIONAL FORGE CRANKSHAFTS IN THEIR POWERFUL COMPRESSORS

It takes a lot of muscle to move gases over the long distances of America's pipe line network and these large Ingersoll-Rand gas-engine compressors have what it takes. Each component that goes into them must perform its function with complete reliability.

National Forge takes pride in being an Ingersoll-Rand supplier. The crankshaft shown here originated with National Forge basic electric steel and was turned out in successive steps of forging, rough machining, heat treating and finish machining. In every step of the process, continuous checks were made to maintain the close control necessary to final performance.

Your forgings receive the same meticulous care when they are National Forged and you may be sure that you receive the finest quality obtainable.

NATIONAL FORGE AND ORDNANCE COMPANY

PRODUCES BETTER STEEL FORGINGS AND MACHINE WORK

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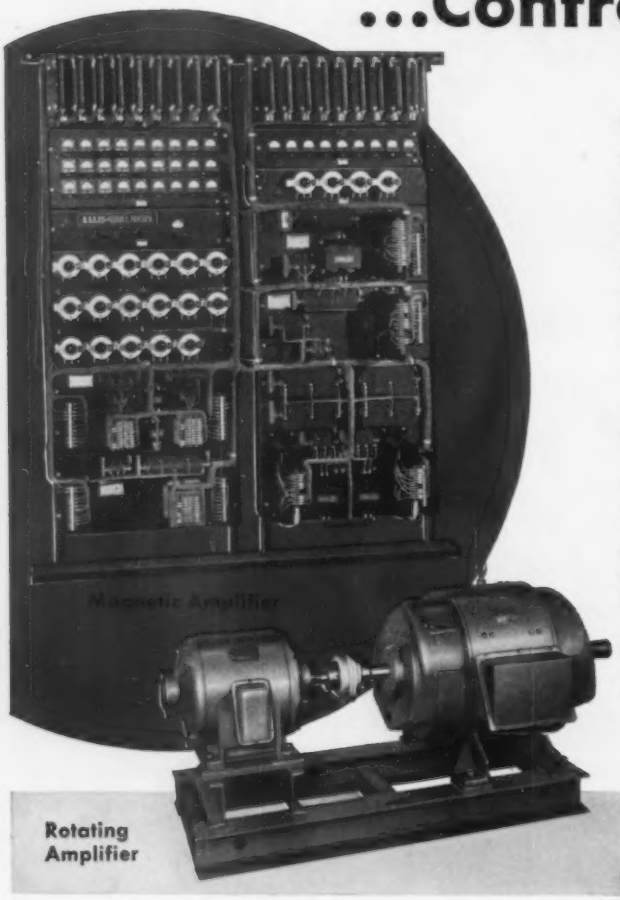
...More Mill Production ...Control Over Quality



Rotating Amplifier

The most important factor in meeting the challenge of more tonnage and improved quality is effective regulation. And effective regulation is more than a matter of good regulator design. It embraces overall *system* design . . . the integration of generators, exciters, motors, regulators and other control equipment. As manufacturer of all these interdependent components, Allis-Chalmers is in a unique position to provide this practical approach to mill regulation.

"Coordineered" System

Allis-Chalmers maintains separate departments, staffed by specialists, for each product. "Coordineering" results from an interdepartment exchange of ideas and technical information correlated in *one* department specializing in metals-producing industry application. All components are matched to meet the requirements of your job. Responsibility for system performance rests with one company.

For complete information, see your Allis-Chalmers representative or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

A-5029

ALLIS-CHALMERS **Regulators**

Three Types of Regulators Available

The following types of regulation are "coordineered" into an Allis-Chalmers system:

1. **Regulex Rotating Amplifier** — Applicable where high power levels for reversible output are desired.
2. **Magnetic Amplifier** — Applicable where low power levels for reversing or high power levels for non-reversing are desired.
3. **Combinations of *Regulex* Rotating and Magnetic Amplifiers** — Each complements the other for maximum efficiency.

Analytical Facilities Utilized . . .

System performance is simulated in the computers to get optimum configuration of components. The constants and exciter ceilings necessary for desired response are established.

Regulex is an Allis-Chalmers trademark.

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NEWSFRONT

How Long Can You Store CO_2 Cores?

What kind of shelf life can you expect from cores hardened by the CO_2 process? One determining factor is humidity in the foundry. If it's air-conditioned, shelf life is virtually unlimited. Life drops off sharply, though, with increasing humidity. Newly-developed inhibitors are said to stretch storage life over a reasonable period of time.

And Soon, Aluminum Truck Wheels

Forged aluminum truck wheels are on the way. Both truck builders and users want them, but difficulty in making contours means aluminum forgers must redesign wheels for aluminum. Advantages are reduced weight, more payload, faster heat dissipation. In addition, aluminum's freedom from corrosion along sealing edges of tubeless tires means rust flakes can't rub on tire surfaces, cause air leaks.

Permanent Magnet Separators

Permanent magnets are coming into their own for a wide range of handling applications. Steel mills have been using permanent magnet rollers for some time for fast startups, stopping of sheet and strip. Now one large fabricator is going one better, putting plate and roller magnets to work separating and feeding heavy steel sheets.

Where Will Scrap Spiral Stop?

Don't look for any real downturn in the current booming scrap market—not till rumors of a steel strike get really hot anyway. Current heavy demand reflects real physical shortages of metallics by mills which failed to buy when prices were slacker and which underestimated the continuing strong steel demand.

Postscript On Taconite

Savings through taconite are now seen as even higher than anticipated. Outside steel industry observers claim that taconite pellets should carry a structural premium over Lake Superior ore as high as $3 per ton above bonus for extra Fe content.

April's The Month To Watch

Will the economy drag its feet in 1956? Working economists say April's the telltale month—that the real test hasn't come thus far. Despite much talk of slowdowns, the bellwether economic indicators are sound and holding steady as of March and early April. It's already clear that the first quarter has been a record production period for many industries besides basic steel.

Don't Hold Your Breath

Mass production of the gas turbine is still a long way from reality. To get an idea why, take a look at the costs involved. Chrysler Corp. says that three very small parts for its turbine were produced at a cost of $2500—cost of a whole 1956 car.

Booming Electric Power Outlook

Watch 1956—it'll be another major year in electric power expansion. Suppliers to the heavy electric generating equipment producers report the market is extremely hot. Heavy steel castings are already moving strongly on the basis of electrical generating equipment industry orders.

Closer Tolerance Shell Castings

Shell-molded steel castings, reported as picking up in an earlier IRON AGE issue, are sprucing up on tolerances as well. Complex castings of 30-lb size can be produced to tolerances of 0.006 to 0.007 in. per in. Simpler castings in the 5-lb category are hitting 0.004 in. per in. tolerances.

Springs Exert Constant Force

A soon-to-be-installed spring coiler machine will mass produce an unusual spring in which working stresses apparently exceed the yield strength of the strip stock. Unlike conventional springs, the high-residual-stress springs exert constant force throughout their entire length. Metalworking applications so far: replacing gear trains, anti-backlash mechanisms, and in other devices where constant force is a design requirement.

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Want immediate delivery? Write, wire or phone us now your less-than-mill quantity order. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO".

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING

SPECIAL REPORT

Taconite Gives New Life to Mesabi

First full scale shipments of pellets are ready to roll . . . $500 million industry is already expanding . . . Major steel companies have big investments . . . Suppliers boom with record orders—By *T. M. Rohan.*

◆ IT TAKES the weight of 15 automobiles bearing down on a single square inch of taconite to crush it before the meager 25-35 pct iron can be liberated.

To ship about 11 million tons of these concentrates per year, U. S. and Canadian steel and mining companies have laid over $500 million on the line. Eight of the largest steel companies in the U. S. are involved in taconite development and a full $1 billion industry in five years is a strong possibility.

It's a familiar story why steel companies are investing these amounts in the equipment and facilities to process low grade taconite into high iron content pellets. Dwindling supplies of traditional Mesabi ore dictate that by 1980 more than 40 pct of ore supplies for inland mills will come from taconite — even considering the climbing rate of ore imports.

First Big Shipment

This month first large scale production shipments from a 1 million-ton stockpile of pellets at Silver Bay, Minn., will be made to U. S. steel mills by the Reserve Mining Co. Another eastern Mesabi range plant has been turning them out on a smaller scale since 1951 and a third since 1947.

In spite of the rapid advance to maturity of the taconite program, taconite's final roll in steelmaking is still not firmly established. Most steel companies look on taconite as one phase of a general overall improvement in blast furnace operations designed to bring about higher yields and better quality.

Pricewise, the only pellets now out for general sale are bringing premium price of openhearth lump ore, or $1 per ton over Old Range non-bessemer, now bringing $11.10 per ton delivered at lower Lake Superior district ports.

Each shipment of taconite pellets represents part of the investment that is bringing suppliers of mining machinery and its related equipment some of their heaviest dollar volume business in decades in furnishing the tools. Some of them are the largest of their kind in the world. Others were invented or designed to meet special conditions never before encountered.

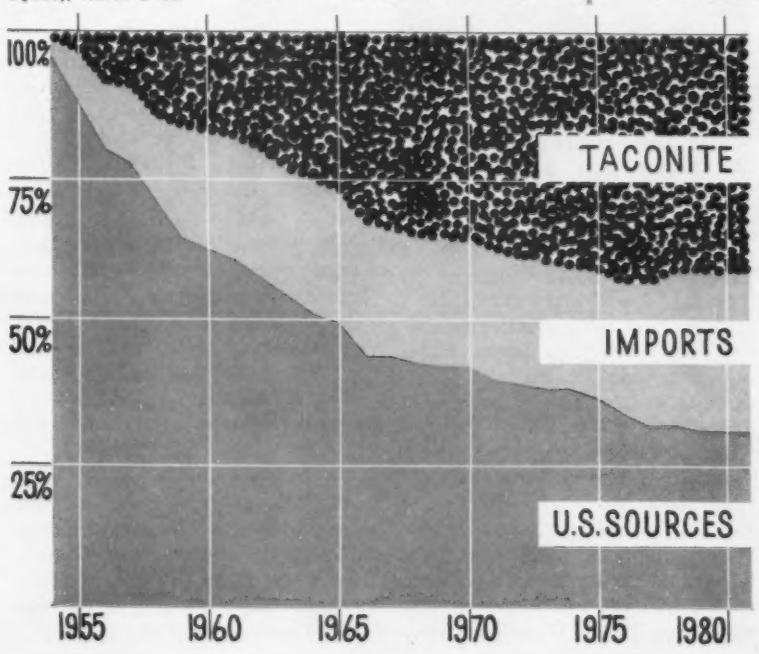
This is how taconite operations stack up today:

The biggest completed project is Reserve at Babbitt and Silver Bay, Minn. Originally slated for $160 million, the project hit almost $190 million after expansion of original plant. Full rated production of 3-3¾ million tons of taconite pellets is in its initial phase. There are provisions for tripling the plant.

The largest, Erie Mining Co. at Aurora, Minn., will start turning out pellets at a 7½ million-ton

Source: Ogleboy, Norton & Co.

How Taconite Takes Up the Slack



rate next year. It has had pilot operations there since 1947. In Upper Michigan and Canada, two additional pelletizing plants are under construction, one for jasper, a non-magnetic cousin to taconite, and another for low grade ore.

Just west of Reserve is Erie's plant with Bethlehem Steel Co., Youngstown Sheet & Tube, Interlake Iron Co. and Steel Co. of Canada as co-owners. Erie had the first pilot plant in 1947 and construction of the new plant is being supervised by Pickands Mather, Cleveland mining firm.

HUGE shovel scoops rock size chunks of taconite from Reserve Mining Co.'s operation on the Mesabi Range in northern Minnesota.

Production will start next year.

U. S. Steel has a relatively modest pilot-production plant combination at Iron Mountain and Virginia, Minn., originally built as a sintering plant in 1951.

About 620,000 tons annually of nodules and sinter are shipped from the plant to U. S. Steel mills for use as quality blast furnace change and occasionally for open-hearths to replace lump ore. Continued technical development has been going on at Oliver Iron Mining Div.'s headquarters, plus testing and perfection of suppliers' equipment.

The Corporation also has heavy holdings in taconite property. Announcement of a full size production plant will probably follow proving out of the system at the blast furnace. Indications point to about 1959.

Expansion Planned

In Upper Michigan, a 600,000-ton plant of Marquette Iron Mining Co. will be completed this year to turn out concentrated pellets of non-magnetic jasper ores. Marquette is owned by Cleveland Cliffs Iron Co., Inland Steel Co., Jones & Laughlin, Wheeling Steel, and International Harvester.

An expansion program of additional 500,000-ton units in 1958 and 1961 is planned. This ore is easier to crush than taconite and richer, since two tons of ore yield one ton of concentrate containing 60 pct or more of iron. The basic system is similar to taconite flowsheets except recovery of the non-magnetic iron is by flotation rather than magnetic separators.

The first taconite plant designed for all rail shipment and using a former direct shipping ore will be a $16 million, 600,000-ton unit of Pickands Mather, 40 miles west of Hull, Canada. Construction is due to start as soon as weather permits with completion and capacity operation set for 1957. This may provide the first large scale shipments of pellets to the open market, although for a time most will go to owners of the project, Pickands - Mather, Jones & Laughlin and the Steel Co. of Canada.

Pellets are being produced now as a byproduct of nickel mining operations of International Nickel Co. at Copper Cliff, Ont., just outside Sudbury about 160 miles east of the Soo locks. This plant is rated at 250,000 tons with output going to Steel Co. of Canada and Algoma Steel Co. of Canada.

Here iron is separated by an ammonia leaching process. Expansion of the present $19 million plant to a 1 million-ton capacity is envisioned by International Nickel, but will probably hinge on improvement of the process.

RESERVE Mining Co.'s jet piercer goes to work blasting holes in the Taconite, at rate of 18 ft per hour.

Mining and processing machinery makers are in the midst of a new field where potential orders are huge, but the engineering and construction problems are unprecedented. As new projects are launched, repercussions are felt in metalworking firms in all parts of the U. S. and even some foreign countries.

Suppliers Boom

In Milwaukee, for example, the taconite program represents $20 in crushers, grinding machinery, separators, motors, controls, trucks, etc.

For the first large scale plant, Allis-Chalmers built the world's largest crusher, a 600-ton gyratory unit costing probably $2 million. It will take taconite boulders 5 ft in diameter, and, although it is as tough a material as will be encountered, crush them to 10-in. pieces at the rate of 3500 tons per hour. Up to 10,000 engineering man hours were necessary to design it and only a few foundries in the country had facilities big enough to pour the 135-ton shell. (And one of these had insufficient rail facilities to get it out of the shop.) Delivery time on the unit was 27 months, mostly for procurement of the castings.

For Nordberg Mfg. Co., Milwaukee, another top grinding machin-

ery builder, its order for 54 rod and ball mills for a new taconite plant was the biggest mining order in history. The firm has been turning out two per week since October, 1955, and will keep up the rate until July of this year. Total orders for taconite equipment there are about $10 million.

Magnetic separating equipment purchases rival in dollar volume the investment in grinding mills. Separators cost about $10,000 with installations behind both rod and ball mills. At first stage, they remove iron-bearing material consisting of two-thirds of the total and, after the ball mill grinding, collect half of this for a final iron content of 62.5 pct for the dewatering and pelletizing circuits.

On the mining end, facilities are much greater than for direct shipping ores. Three tons of native ore for a finished ton of pellets must be blasted loose, trucked out, crushed, processed and transported, so about triple the normal trucks, shovels and related equipment is needed.

New Development

One major advantage here has been the jet piercer developed by Linde Air Products which burns blasting holes in taconite at over 18 ft per hour compared to dismond drilling at 1½ to 2½ ft. The piercer has made it possible to blast loose the large amount of raw taconite necessary from the hardest center portion of the Mesabi range.

In power shovels, too, some of the largest of their type are being used on taconite. Because of the toughness of taconite, a smaller dipper is used on shovels designed for bigger dippers on direct shipping ores. The largest two-crawler shovel ever built, weighing 370 tons and furnished by Marion Power Shovel Co., is a forerunner of things to come.

Machines of this caliber sell for about $400,000 each and are also used in modified versions in copper mining and western iron ore mining. Marion has about 10 of these in operation.

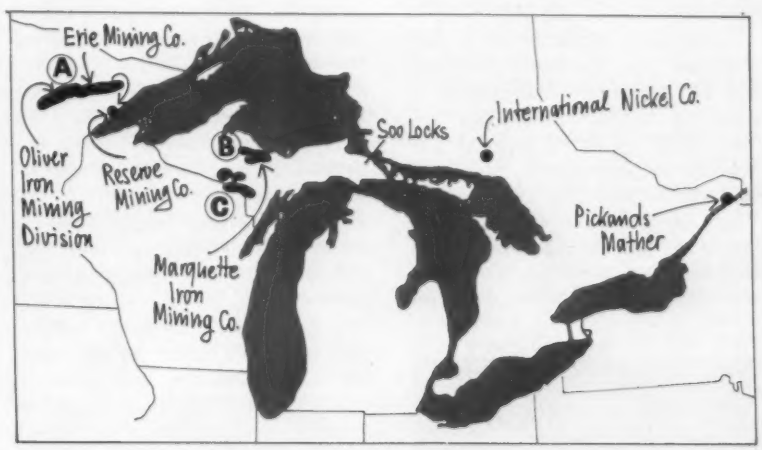
Taconite's eventual effect on blast furnace operation and steelmaking costs is still largely speculative because no full commercial production runs have been made exclusively on the pellets. Some blast furnace operators feel they will always be blended with other ores, largely because of their uniform content, size and analysis.

Closest authoritative estimate

WHO'S WHO IN TACONITE

Location, investment, planned annual capacities of taconite producers.

A—Mesabi Range
B—Marquette Range
C—Menominee Range



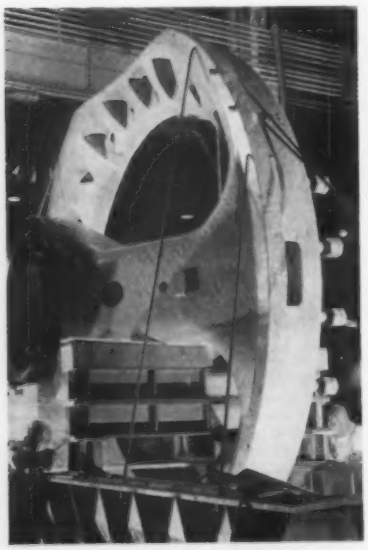
COMPANY	OWNERS	LOCATION	INVESTMENT	CAPACITY	PLANNED ANNUAL TONNAGE
Erie Mining Co.	Bethlehem 45 pct. Youngstown Sh. & Tube 35 pct. Interlake 10 pct. Steel Co. of Canada 10 pct.	Aurora, Minn.	$300 million	7,500,000 tons under construction	10,000,000
Reserve Mining Co.	Armco 50 pct. Republic 50 pct.	Babbitt & Silver Bay, Minn.	$190 million	3,750,000 tons	10,000,000
Oliver Iron Mining Division	U. S. Steel	Mountain Iron & Virginia, Minn.	$23 million	600,000 tons	10,000,000 by 1959
International Nickel Co.	International Nickel Co.	Copper Cliff, Ont.	$19 million	250,000 tons	1,000,000
Pickands Mather	Steel Co. of Canada Jones & Laughlin Pickands Mather	Hilton Mine, 40 miles W. of Hull, Que.	$16 million		600,000 by 1957
Marquette Iron Mining Co.	Cleveland-Cliffs 47 pct. Inland Steel 20 pct. 33 pct. between Jones & Laughlin, Wheeling, Int. Harvester	Republic, Mich.	$14 million* * Iron Age estimate.	600,000 tons this year	2,000,000

in increase in iron ore yield from beneficiation vs. non-beneficiation is slightly under 16 pct improvement, independent of raw material used. The fact that only a half dozen or so new blast furnaces are in the talking stage, despite the huge steel expansion plans, would substantiate anticipation of higher yields from existing furnaces. Higher iron content imported ore as well as taconite figures in future planning.

Future Plans

Copperweld Steel Co. at Warren, O., producer of electric furnace grade specialty steels, is planning to undertake direct electric smelting of the pellets when a steady source of supply can be lined up.

Copperweld plans to crack natural gas into hydrogen and carbon black and use hydrogen as a reducing agent. Indications are that 10,000 cu ft of natural gas per ton of pellets will be necessary. This puts cost of pig iron about 20 pct over use in blast furnaces, but would establish a median point, avoiding the peaks and valleys of buying high grade electric furnace scrap in the topsy-turvy northeastern Ohio scrap market.



CASTING being made by Allis-Chalmers for a gyratory crusher will weigh about 95 tons after machining.

Copperweld sponsored successful research at Battelle Memorial Institute to verify the findings of the Euby-Lorig process. Direct reduction is being used successfully in Sweden with carbon monoxide as a reducing agent and low cost hydro power. Copperweld feels the system is feasible here despite higher costs, after taking credit for sale of the carbon black to tire manufacturers.

Tax Problems Ahead

One aspect of the taconite business producers don't like to discuss is the tax tightrope they are walking. Minnesota iron ore tax laws are among the most severe in the country and provide one of the biggest sources of revenue for the state.

One mining firm, for example, is paying $1 million per year in taxes on a reserve mine from which it hasn't taken a shovelful of ore in 40 years. The famous taconite law of 1941, which taxed output rather than ore held in the ground, paved the way for the development.

Reviewing the actual operations, both the Reserve and Erie plants will be largely carbon copies from a processing view based on work done years before. But they will differ in size and logistics. Reserve has primary and secondary crushing facilities at Babbitt, then hauls two tons of ultimate waste for every ton of iron 47 miles to the concentrator and harbor at Silver Bay on Lake Superior. Tailings are pumped to the lake where they are carried out into a 900 ft deep underwater canyon that will take wastes for many decades.

Erie will do all crushing, grinding and processing at one site at Aurora and haul pellets 73 miles to its dock at Taconite Harbor. While no waste will be carried to the lake, tailings must be hauled away from the plant and piled up. Ten cars of coal and six of fuel oil must be hauled daily to the plant from Taconite Harbor.

Erie's rail line will run only in the shipping season while Reserve's is to operate throughout the year when temperatures occasionally reach 40° below zero. Reserve uses a unique downdraft traveling grate for sintering.

COARSE rock crusher built by the Reserve Mining Co., will crush about 60 tons of taconite rock per minute.

Some of the construction and logistics problems in taconite tax the imagination. At Reserve, the 47-mile railroad connecting the Babbitt, Minn., crushing plant and E. W. Davis works concentrating plant on the shore of Lake Erie took 5600 carloads of construction material.

Additional Projects

The concentrating building required excavation of 1.75 million cu yd of granite. Total Babbitt and Silver Bay plants required 25,616 tons of structural steel, 229,553 linear feet of steel piling and 6802 tons of reinforcing steel. A complete 40,000 kw steam power generating station was also built with provision for tripling its size. At Erie it involved building a cofferdam to excavate rock deep enough to make a harbor for the biggest ore carriers anticipated.

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ALUMINUM: Fights Inroads In Aircraft

Manufacturers of aluminum are not resting on laurels in aircraft industry . . . New developments are designed to halt inroads of new products into market . . . New precision forging is one example of work done.

◆ ALUMINUM MAKERS have long looked on airplane building with a maternal eye. But inroads by titanium, stainless steel and alloys are making them look to their laurels and sparking a new drive to recapture and consolidate markets.

One new hot item—a zero draft precision forging—is holding the front for aluminum in the airframe industry by cutting costs from 30 to 75 pct under conventional forgings. Cleveland Works of Aluminum Co. of America, world's largest aluminum forge plant, is doing a heavy development and some production in these forgings in which all taper is eliminated on either inside or outside walls of forged shapes.

Can Cut Costs

The draftless precision forgings are cutting finished costs from 30 to 75 pct on long runs where higher die costs can be amortized.

Finished pieces have a satisfactory surface and no extra machining for weight or fit is necessary, only simple milling or drilling operations are sometimes required for assembly. The necessary precision dies may cost three to six times the amount of conventional dies. Longer runs will help amortize high die cost.

The pressure from customers is so heavy that more or less experimental facilities are being pushed into production use at the ALCOA Cleveland plant. Major aircraft items are bulkheads, wing flaps, automatic seat ejectors, etc. Size varies from a few ounces to 170 lb and up to about 700 to 800 lb total can be used in largest bombers. The forgings are made on powerful, slow-working hydraulic presses which will hold the wall thickness and tolerances practically equivalent to machine surfaces. Knockouts, sitting flush with the bottom of the die, gently push the finished piece out.

Supersonic Market

Aluminum producers also have high hopes of getting more aluminum into inhabited parts of supersonic planes where temperatures must be kept low because of pilots and instruments. On air frames themselves, operating temperatures of up to 400° are fast becoming routine, thus spurring the aluminum proponents on to meet the requirements.

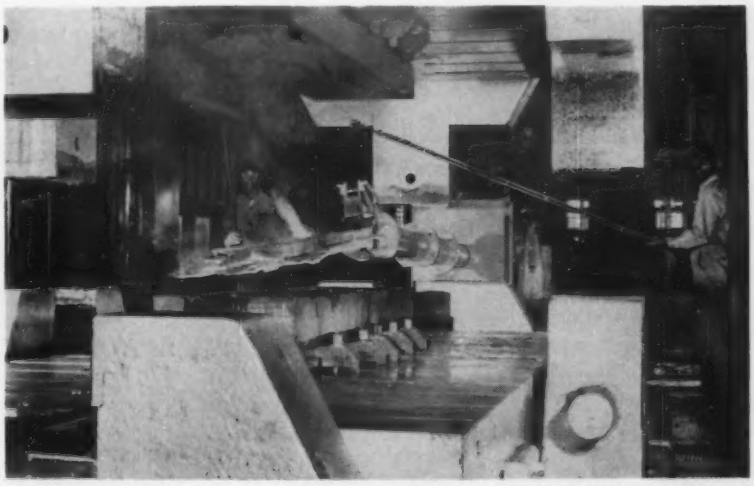
Back in the laboratories, wrought products made from fine aluminum flake powder are being experimentally turned out up to 21 in. diameter and 800 lb. The compacts are extruded in the conventional manner and may be either forged to shape or rolled into sheets. Experimental quantities of sheet, foil, extrusions and forgings are being tested by several companies and several extrusions and forgings are in commercial use.

High Temperature

Production facilities for making compacts have not been set up as yet, but the leading contender is M257 which is readily forgable.

Some high temperature aluminum is being used in aircraft engines where its light weight and cost advantage give it a lead over titanium. One hollow extrusion is being used on jet engine afterburners operating at 700° F. This is a 3.5-in. outside diameter tube machined to a 1.5-in. interior diameter at a cost about a quarter that of titanium.

In wrought aluminum alloys, aluminum - copper - magnesium types are preferred over the ones containing zinc since the latter loses strength rapidly above 250°.



ALUMINUM forging being removed from a press at Aluminum Co. of America's Cleveland plant will eventually be a wing spar in a U.S. Air Force plane. Workman with long spraypipe is applying a lubricant to the forging dies. First "blocking" or forging squeeze has just been performed.

MANAGEMENT

PROFIT SHARING: Dividends for Everybody

Splitting some of the company profits pays off . . . Job interest is stimulated, employee loyalty increased . . . Companies of all sizes find it works out . . . Some case histories—By *K. W. Bennett.*

◆ IF YOU'RE in metalworking and are watching new management practices closely, it's odds on that you've looked at profit-sharing. It can boost production, reduce quality control costs, bring workers and management into surprisingly close harmony.

Who's in the swim? In 1953 an analysis of business management practices showed that 5 out of the "10 best managed firms" in the U. S. had employee profit sharing plans. An estimated 20,000 profit sharing plans of all types are in operation in the United States, and at least 10,000 plans paying a worker a share of going profits as well as banking a split of the profit for his retirement pay envelope.

Joseph Meier, of the Council of Profit Sharing Industries, which has at least 850 profit sharing plans submitted by member companies on file at the Council's Chicago offices, reports that membership is about equally divided among companies preferring direct pay-as-you-go profit splits for their employees, and those which place the money in a trustee fund for deferred payment, usually when an employee retires.

But fastest growing is a combined plan, wherein the employee takes part of his share of company profits on the pay-as-you-go basis, banks another portion in a trusteed fund for use in retirement or illness.

Thus far, larger companies have favored the deferred payment plan, smaller firms the pay-as-you-go system. Both are moving into the combination plan in force, however.

How It Works

Among the users of deferred payment plans, Dominions Steel, Signode, Vulcan Iron, Wheelabrator, Bell & Howell, Graver Tank, and Columbia Pipe are familiar names. Signode, with an excellent plan, is a case in point. An employee becomes eligible for the plan (it's up to him if he elects to join or not—892 of 898 employees have), after one year's service.

The employee may contribute 2-4 pct of total earnings from his own pay envelope and the company contributes up to 20 pct of net yearly profit but no more than four times the employee contribution for that calendar year. For the first five years of his membership, the employee may withdraw all of his own contribution and 50 pct of the company contribution at any time that he drops the plan.

After five years, his lump sum payment builds up percentage-wise, enabling him to take home an additional 3 pct per year of the company contribution to his share of the profit-sharing fund. He can take his final payment in a lump sum, or in a combination lump-sum-plus-company-stock, or in 10 equal annual installments.

Direct Payment

Examples of the direct payment plan, despite its greater acceptance in small plants, can be as big as Eastman Kodak, Lincoln Electric (which plan is generally held in high regard and has been widely reported), Chromium Mining & Smelting, Sheaffer Pen, Vanadium Alloy Steel, C. A. Norgren, and Quality Castings, to mention a few.

In Philadelphia, Leeds & Northrup has a profit-sharing program dating back to 1916, with the current plan in effect since 1937. All employees with over nine months' service are eligible in a program based on salary and length of service with the company.

The company feels that the plan

Who Profits in Profit Sharing?

Who's in it?

An estimated 20,000 profit sharing plans are in operation in the U. S. Size of company ranges from smallest to large corporate giants.

What kinds of plans are there?

Direct pay-as-you-go profit splits for employees.
Deferred payment, where money is placed in trust.
Combined payment, where employee takes part, banks part for future.

How does it aid management?

Stimulates job interest.
Holds good workers in times of labor shortage.
Attracts high type of worker.
Stimulates employee interest in company problems.

is helpful in attracting good, progressive-minded workers, it is definitely a help in holding skilled workers.

Employees are informed at regular intervals of the company's earning position, rate of incoming orders, and amounts each might anticipate at the end of the year at current rate of business.

The combined plan works well and has dovetailed with SUB programs as harmoniously as Love and Marriage. Procter & Gamble led off, with a profit sharing plan in which payments are both current and deferred, dating back to 1887. Marvel Metal Products, Chicago, with 68 employees, has been cited as a smaller metalworking firm with an excellent, working profit-sharing plan.

Commercial Steel Treating of Detroit utilizes a profit-sharing plan in an area that has been a hot center of the SUB development. The program is the combined type, centering around a trust fund and current payments. After 30 days of uninterrupted employment the employee is eligible for monthly profit-sharing payments, based on total number of hours all participants in the program worked in that month, and all hourly-rate employees divide 50 pct of total profits over 10 pct of sales in any given month.

Deferred Payment Plan

Another 20 pct of the company-retained profit goes into the deferred payment or trustee fund. Employees become eligible for the trust fund after 90 days continuous service, and before taxes, Commercial Heat Treating deposits five cents per straight time hour worked by employees having less than three years seniority, as well as 20 pct of remaining profits. Part of the trust fund is used to make loans to employees who are building or improving a home or who need financial help over a bumpy period. The deferred profit payments are given to the employee on retirement in equal payments over five years, or as a lump sum, or as a lump sum in the event of permanent disability, or on death as a lump sum to designate beneficiaries.

MARKETING

SCREW MACHINES: Market Up

Sales for January-February 1956 up 10 pct over same period last year . . . Fall-off in inquiries core of cautious attitudes . . . Outlook generally considered good.

◆ OFFICIALLY, members of the National Screw Machine Products Association weren't talking on the outlook for '56 at their Milwaukee meeting last week. But it's a safe bet that screw machine products sales for January-February of this year ran nearly 10 pct above same period year-ago.

The best post-war year saw sales level reach $600 million. Nineteen hundred fifty-five was a close second to the record with a $500 million sales total.

Current caution is due to a reported drop in incoming inquiries. But corridor conversations with veteran screw machine men indicate a strong business level generally. Slowdown in inquiries seems to be closely tied to the automotive industry and its suppliers. With backlogs running at 9-10 weeks, a high level of activity through first half is assured.

Prognostication

Association executive vice president Orrin B. Werntz has predicted an $800 million annual sales total for the industry by 1965. Augmenting his hopeful forecast are the outlooks of the diversified markets served by the screw machine products industry.

About one-fifth of total screw machine jobbing output goes into defense work today. There have been some cutbacks in this business, but the long range outlook is strong with replacement of obsolete aircraft and missiles expected to continue at a high rate.

Another market for screw machine products that looks good includes radio, television, and appliances. Currently capturing about one-fifth of jobbed screw machine business, this market is considered capable of considerable growth.

In the short term outlook it's notable that appliance makers have forecast an overall increase in heavy appliance sales this year of about five to six pct.

Automotive is the big question mark. Automakers usually account for one-fifth to one-quarter of screw machine output. A few nibbles in the form of inquiries have brightened the outlook in recent weeks, but these have not been spelled out in orders.

Trends

Plumbing hardware, smaller segment of the market, estimated at roughly 10 pct, is setting a good pace. Housing starts in some areas are beginning to confirm the estimates made earlier this year by government housing officials that 1956 would see 1.3 million new homes started.

Screw machine products men have two trends working in their favor. Big buyers are jobbing out increasing quantities of screw machine work, and this includes larger firms such as General Motors, Ford, Chrysler, International-Harvester.

And screw machine products producers themselves are producing in such a manner as to indicate that a properly engineered screw machine product from a jobber can be more economical than an in-plant produced part in a comfortable number of cases.

For instance, fringe benefits for each new man hired to manufacture an in-plant part is about $733 per year, in addition to his basic wage. Inspection, plating, and packaging requirements may boost in-plant investment well beyond the cost of jobbing a part.

Inquiry slump or no, the outlook for screw machine products looks pretty encouraging.

BUSINESS

WESTINGHOUSE: How Stockholders React

Annual meeting brings criticism of strike tactics . . . But union leaders alienate many . . . Price wins applause when striking back at labor leaders . . . Losses from strike are heavy—*By G. J. McManus.*

◆ ANYTHING can happen when a company's leadership goes before its stockholders following a period of near disaster.

And just about everything did last week at the annual meeting of Westinghouse Corp. stockholders, shortly after the end of a long, costly and controversial strike.

Everybody talked, from union leaders to Westinghouse's TV girl Betty Furness. And many who came to carp stayed to voice sympathy when union tactics alienated many who were themselves critical of the company's handling of the strike.

Company head Gwilym Price came before the record gathering of some 1400 stockholders representing some 79 pct of capital stock to report that the strike cut shipments $300 million and that first quarter '56 operations were in the red by $1 a share.

Before there could be any general comment, the tone of the meeting was set by union officials.

MANAGEMENT'S PRICE: His patience was tried to the limit.

Present as stockholders, they lit into management on strike issue. But for many this had a negative reaction. If they had come to carp, the length and hostility of union statements swung them the other way. Management had the sympathy of the meeting as a whole.

Management Applause

This was apparent on the few occasions when Mr. Price replied sharply on questions of labor relations and management performance. Most of the time, he avoided detailed wrangling but when he did hit back, there was warm applause. And in the principal vote of the meeting, the proposed slate of eight directors was approved without opposition or incident.

Here's the way it went: Mr. Price in his prepared remarks explained the company's stand in the strike. A five-year pact was needed to compete with General Electric, he said; certain management rights could not be yielded.

He said a settlement had been gained without concessions on the essential points of the original company position. He said operations were rapidly being restored to normal and that the outlook was bright for heavy apparatus, defense, nuclear equipment and consumer sales. A stepped up advertising program was planned. Expansion would be at a steady rate rather than in sudden explosions.

Then the meeting was thrown open to questions from the floor. They came. Sandwiched between a rehashing of strike issues, there were commendations of management and suggestions on employee relations, profit sharing, retirement age, training programs and truck service. Betty Furness, the

LABOR'S MONAHAN: Charges Lockout.

Westinghouse TV girl, sounded several cheery notes. A goodly number of the 26,000 employees holding company stock were present and not at all backward about voicing their views.

Give and Take

But the big thing was the strike. John Monahan, an officer of the UE local at the Westinghouse South Philadelphia plant, started things off. He said the current work stoppage at South Philadelphia was a company lockout. He discussed wage terms and he said company delays in negotiating were keeping 6000 men idle.

Robert Blaiser, company industrial relations chief, said delays were the result of recurring violence on plant picket lines. He said company officials had had difficulty getting into the plant and he referred to a recent auto smashing as an example of the kind of thing that had stalled talks.

Ladd Bolling, of the IUE local

at the Westinghouse, Lima, O. plant, charged management with creating dissension among employees, violating contracts over the past two years and perpetuating bad feeling by discharging seven employees for alleged violence during the strike.

Mr. Price declined to get into a general discussion. On the matter of past abuses, he did say that of the eight bargaining units at Lima, the only ones involved in work stoppage during the period mentioned were the three controlled by Mr. Bolling's IUE.

The words dissension and violence were kicked back and forth. The company was charged with stirring up hatred and using strong-arm tactics. The wife of a

TV's FURNESS: A cheerful note.

Sharon, Pa. Westinghouse employee said union violence had terrorized the town during the strike and that persecution of loyal employees continued. She said it might well be that non-striking workers were now carrying weapons for protection and she blasted state officials for denying police re-enforcements.

Apart from the labor issue, two points that stirred considerable interest were the contact between top management and the lower levels and the problem of service on home appliances.

On the matter of appliance performance, Mr. Price felt that most complaints could be traced to service and that the role of retailers in this area created problems for all manufacturers.

BUSINESS

PHILCO: Fight For Life

Major TV producer turns to mechanization in what it terms "fight for economic life" . . . Union goes along, at least temporarily . . . Contract expires soon.

◆ PHILCO Corp., once a mechanization pioneer in its field, has launched a new million dollar automation program, this time in a "fight for our economic life. . . ."

The company has taken its case directly to its employees in a blunt, 10-page statement of its position and objectives. For the moment at least, the union membership is in accord.

Philco insists that its reason for making the move to more extensive automation is the fact that production costs are too high, pushing prices for Philco television sets out of competitive line.

Union Stand

Union is willing to go along because (1) Philco promises no reduction in employment because of the move, and (2) the company claims that its mechanizing of production and assembly lines does not constitute an attempt at speed ups.

It appears that the union is reserving judgment until it sees how the move is working out. Philco's contract with locals 101 and 102 of the International Union of Electrical, Radio and Machine Workers runs out April 30.

Union leadership has expressed the opinion that does not completely agree with the Philco "fight for economic life" claim since the company enjoyed record sales and net earnings in 1955.

Company Aims

Goals outlined by the company in its report to employees include:

1. Higher quality production through introduction of printed wire circuits and mechanically inserted components.

2. Elimination of testing units on assembly lines.

3. Considerable reduction in the number of rejects, now considered to be among highest in the industry.

4. Inventories of parts and materials stored closer to machines, reducing moving time and paper work.

5. More effective use of personnel.

Or Move

Main alternative to large scale automation, according to the company, was a major move entirely out of the Delaware Valley area to a lower production cost location. This, no doubt, played a role in the decision of the union to back management, at least temporarily.

The fact that automation is an established trend in the industry was recognized both by Philco and IUE. Reese B. Lloyd, vice president operations, Television Div., indicated that Philco felt the problem was no longer desirability, but rather whether a company progresses with the competition.

Mechanization

Harry Block, president of the District 1 union council declared that, "If Philco did not start something of the kind, they wouldn't stay in business."

Philco's long range explanation of its move to mechanization is its estimate that by 1965 40 pct more goods and services will be required in industry with only an estimated increase of workers available of 14 pct.

Philco Corp. lays claim to the title, "pioneer in mechanization in our industry," by virtue of the fact that in 1930 the company introduced the conveyorized assembly line, born in the auto industry, to radio; and in 1939 established one of the first continuous assembly lines in radio production.

RESEARCH

SMOG: Why Industry Wants Clear Air

Expanding battle to clear up smog is costing industry at least $300 million a year for research . . . Los Angeles is not only city with the problem . . . Federal and state governments also step up programs.

◆ INDUSTRY is taking the lead in an expanding battle to clear polluted air over major industrial centers and surrounding agricultural regions.

Metalworking's interest in smog control, heightened in the last few years, is partly selfish—improved public relations and improved worker health. But the staggering toll of some smog situations, deaths in some places, millions of dollars of crops ruined, and damage to property, is a responsibility that more and more businessmen don't want to bear.

Spend for Research

It's estimated that industry is spending at least $300 million a year now in basic smog research, in studying local problems in order to eliminate them, and in installing antismog equipment.

Research into the smog problem is paying off. Latest automatic plant smoke control equipment not only cleans the exhaust from stacks, but shuts itself off when not needed, thus reducing the operating costs and making a smog control program more appealing to industry.

Federal and state governments are also stepping up their antismog research programs.

The U. S. Public Health Service, which until recently barely took official notice of smog problems, is spending $1.7 million this year in research and grants to states and organizations to help them lick specific smog problems. In the 12 months beginning July 1, the Service has requested a whopping $3 million to expand its grants to private research groups and to begin giving grants for smog-control demonstration projects.

The demonstration program is aimed at selling industry on installing smog-control equipment.

Cities, too, are spending large sums to try to clean the air.

In 1954, Pittsburgh dished out $80,000 for air pollution. The same year, Los Angeles county spent $720,000; Chicago, $252,000; Cleveland, $200,000; Cincinnati, $110,000; Philadelphia, $78,000, and Omaha, Neb., $20,500.

Try New Approach

Studies on the effect of various types of weather on air pollution is opening up new fields for smog-control. A device developed by the Friez Instrument Div. of Bendix Aviation Corp. uses an aerovans recording system to measure wind speed and direction, as well as changes in gustiness of wind. This is hooked to smoke control equipment to shut it down when the weather will permit harmless natural dissipation.

The Bendix system, named the Windtrol, can also be used to automatically operate a booster blower to increase stack draft and blast smoke and fumes higher in the air when needed, so they will blow harmlessly away.

Affects Site Choice

Many companies, impressed by huge smog damage costs, are studying weather conditions before building new plants so they can install pollution control equipment and design facilities to minimize smog.

Another facet of smog control is the automobile's role in contributing to the eye-smarting gloom in many cities, particularly Los Angeles. Automakers are investing on smog studies and are working on mufflers and other devices that may cut the auto's output of hydrocarbons, generally believed to be a major smog cause.

What Price SMOG Control?

▪ Smog research and control is stepping up rapidly. Industry, spurred by public relations and health considerations, is now spending an estimated $300 million a year. The federal government socked $1.7 million into research and grants this year; wants $3 million next year. Here are what some cities are spending to help solve their own problems: *

Pittsburgh	$ 80,000
Los Angeles County	720,000
Chicago	252,000
Cleveland	200,000
Cincinnati	110,000
Philadelphia	78,000
Omaha	20,500

*** Spent in 1954**

Censorship:

Defense Dept. clamps lid on information publication.

New, tight restrictions over exchange of information by military contractors and subcontractors through advertising and technical articles is now being imposed.

In a new security directive, the Defense Department severely limits information which may be made public by industry or military services on guided missiles, aircraft, power plants, and components or accessories. Order is necessary because "premature release to the public . . . constitutes a grave threat to national security," Defense Secretary Wilson says.

Order is complete with detailed check lists to govern release of information, strictly prohibits all but the most general information on planes and missiles from being made public.

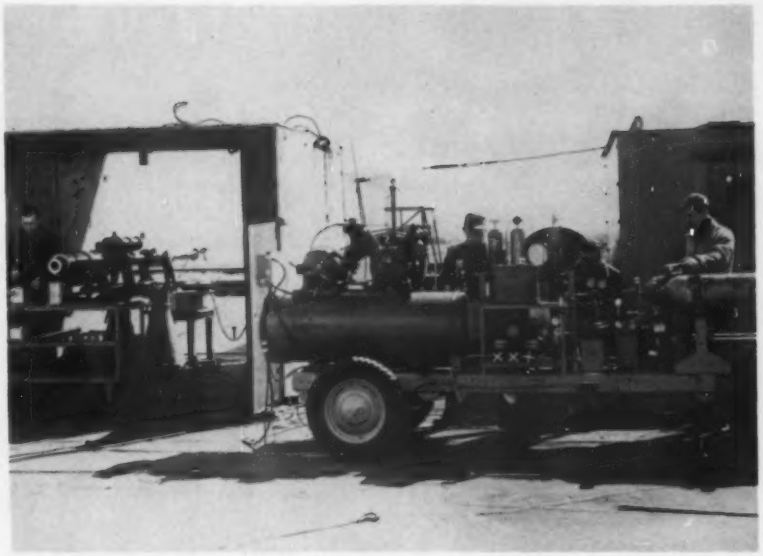
In the guided missile field, capabilities, armament details, control and guidance systems and launching and propulsion methods can not be discussed.

Information about design studies and technical problems on military aircraft engines is also drastically curbed.

Only after the military accepts a 50-hour qualification test, will the type, model designation and manufacturer's name of an engine be made public. External photographs and drawings, and some internal sketches which do not reveal significant details, will be released only after 150-hour tests.

General engineering principles and aerodynamic design information of military aircraft will no longer be made public. When new planes become operational, general physical characteristics, including photographs, and general performance will be made public.

The new Pentagon order is the second major secrecy lid clamped on exchange of industry information in the last two years. Pentagon this time is putting special emphasis on making sure subcontractors do not "leak" any information. Prime contractors are required to work with their suppliers to enforce the secrecy regulations.



GOLF BALL sized spheres have been launched at speeds in excess of 10,000 ft per second in tests of the Navy's new 40 MM Hypervelocity gun developed by U.S. Naval Ordnance Laboratory, White Oaks, Md. At left is firing circuit and right is propellant, being checked for future tests.

Enter Satellite Project

Components for the huge rocket to lift the first man-made moon from the U. S. into its orbit several hundred miles above the earth will be supplied by four subcontractors named by the Navy.

Prime contractor for the rocket portion of the project is Glenn L. Martin Co., Baltimore. New subcontractors are Minneapolis-Honeywell Regulator Co., Minneapolis; Vickers Electric Div., Vickers, Inc., St. Louis; Grant Central Rocket Co., Redlands, Calif.; and Allegany Ballistics Laboratory, Cumberland, Md.

Minneapolis-Honeywell will design and build a reference system to indicate the rocket's position in relation to roll, pitch, and yaw.

Vickers Electric will provide the magnetic amplifier auto-pilot to control the flight of the rocket to a point some 300 miles above the earth. The auto-pilot will take its instructions from the gyro reference system.

Grand Central Rocket and Allegany Ballistics are to design and develop the final stage of the three-stage rocket. It is to use a solid propellant. First and second stages will be liquid-fueled.

Atomic Aircraft

New Air Force contract gives Lockheed Aircraft Co. the job of building and running a nuclear airplane test center, Dawsonville, Ga.

It is expected that the primary initial project will be construction of a frame to house an aircraft atomic engine, and development of shielding to protect the crew from atomic radiation.

Cost of the project is unofficially estimated at about $50 million. Staff of the facility is expected to number about 500.

Lockheed had previously been awarded a contract for a preliminary design study for an atomic aircraft. The firm operates a plant at Marietta, Ga. It is expected that eventually production models of the nuclear powered plane may be built here.

EXPANSION IN INDUSTRY

Merger:

Borg-Warner, York will merge if stockholders approve.

Borg-Warner Corp., Chicago, will acquire all of the assets and assume all of the liabilities of the York Corp., York, Pa., manufacturers of air conditioners, if stockholders of the latter company approve the move. A meeting is scheduled for some time in June for this purpose.

Directors of both corporations have approved and recommended the action.

Tentative plans call for the exchange of one-half share of Borg-Warner common stock and $2 for every share of York common.

At present Borg-Warner is involved in production of automotive components, refrigerators, washing machines, oil burners, aircraft accessories, oil field equipment, farm implement parts, steel and plastics.

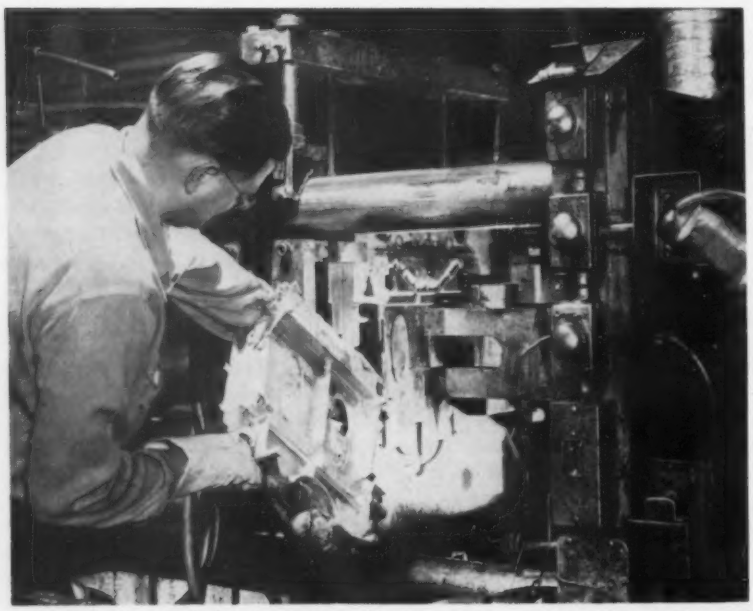
Roy C. Ingersoll, board chairman of Borg-Warner indicated that if the plan goes through, York will be operated as a separate division with no change presently anticipated in the policies, management or personnel.

Link-Belt Plans

Link-Belt Co., Chicago, Ill., will spend a total of $3.5 million for a new foundry and new manufacturing facilities at its Ewart plant, Indianapolis.

Ground will be broken for the foundry almost immediately with actual construction expected to take about a year.

After the new foundry is in operation, the present foundry facilities will be razed and replaced with new production facilities. The entire program is expected to be completed in 1958.



WORKMEN at Toledo plant of Doehler-Jarvis Div., National Lead Co., will soon be removing more castings from dies. Current plans call for a boost in capacity of 20 million lb of aluminum and 15 million lb of zinc.

Electric Arc Furnace

A new 3-ton electric arc furnace has been placed in operation at the foundry of the Pangborn Corp., Hagerstown, Md. New installation is expected to produce six heats per day and increase the company's capacity of cast metal parts by 300 pct.

Pangborn says that the new furnace makes the company the biggest user of electricity in the area.

Expansion Briefs

Liquidometer Corp., Long Island City, N. Y., manufacturers of liquid gaging instruments; new engineering sales office in Los Angeles.

Beckman Instruments Inc., Fullerton, Calif.; acquisition of a new site for German subsidiary in Munich; construction expected to cost $300,000.

Alan Wood Steel Co., Conshohocken, Pa.; new ore bridge at blast furnace dept.; cost $1.3 million.

Speedway Manufacturing Co., division of Thor Power Tool Co., Chicago, Ill.; construction of new plant; occupancy expected early 1957.

Pacific Coast Borax Co., Los Angeles; new open-pit mining operations and expansion of processing plant.

Cummins Engine Co., Inc., Columbus, O.; addition to manfacturing plant, new equipment to boost production 17 pct; expected cost $6 million.

Oliver Iron Mining Div., U. S. Steel Corp., Duluth, Minn.; new ore sizing plant at Virginia, Minn.

Simple Arithmetic...
Type 302, Sheet Base Price 44.50 cents per lb.
Type 430, Sheet Base Price -34.50 cents per lb.
Saving 10.00 cents per lb.
in Stainless SHEET Costs!

Now You Can SAVE $200 Per Ton!

Many designers and fabricators who are currently using Type 302 stainless can, in numerous applications, specify Type 430 straight chromium stainless and take advantage of the 10 cents per pound difference in base price. Some of our customers are already saving more than $200 per ton using our 430 MicroRold stainless sheet.

The steel industry estimates that 50% of all stainless sheet applications could satisfactorily employ Type 430, the least expensive of all stainless grades, as an economical and practical material. When properly applied, Type 430 has all the desirable qualities of beauty, corrosion resistance, strength, long life and low maintenance that no other material, except stainless, can offer.

We are currently producing our MicroRold Type 430 sheets in thicknesses .005" to .109" with 2B or 2D finishes; and in thicknesses .010" to .109" in No. 3, 4 and 7 finishes.

Send for Your copy, "Care and Use of 430 MicroRold Stainless Steel"

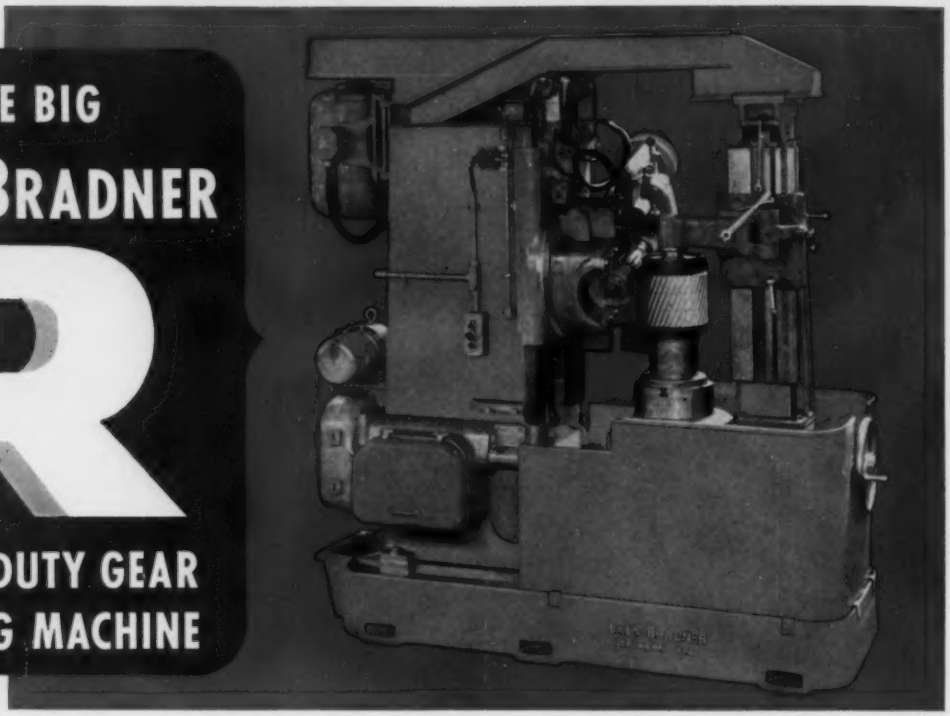
Washington Steel *Corporation*

4-L WOODLAND AVENUE, WASHINGTON, PA.

Extra Rugged...

For The ROUGH Hobbing Jobs!

THE BIG
LEES-BRADNER
R
HEAVY-DUTY GEAR HOBBING MACHINE



Built rugged and reliable to handle those rough, tough gear hobbing jobs . . . that's the new Lees-Bradner Model "R".

It's designed to hob spur or helical gears up to 1¼ DP with a left or right hand maximum helix of 45°.

The Model "R" features fast loading and unloading, ready access to index and feed change plus easy operation and maintenance.

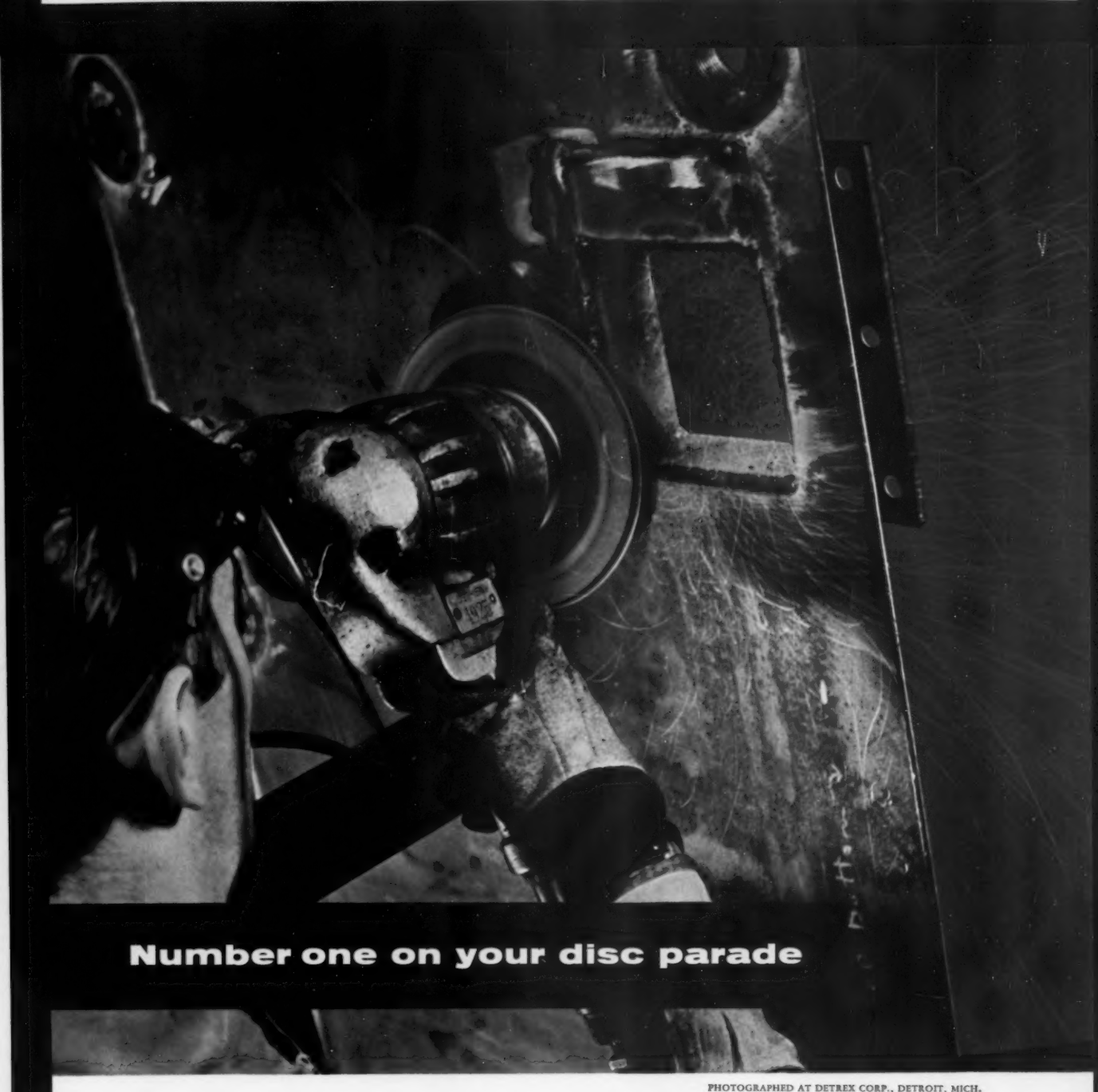
Write for your free brochure giving the detailed capacities and specifications of this new heavy-weight hobbing machine.

SPECIFICATIONS

Maximum outside diameter with tailstock column	16"
without tailstock column	18"
Minimum C/D hob to work	1½"
Maximum C/D hob to work	12"
Travel	18"
Maximum diameter of hob (3-1, 6-1, or 12-1 backgearing)	10" x 10"
DP range	1¼ DP to 16 DP
Maximum manual (or electric) shift of hob	6"
Diameter of hole through work spindle	2"
Machine weight	13,000 lbs.

the **LEES-BRADNER** *Company*

CLEVELAND 11, OHIO • U.S.A.



Number one on your disc parade

PHOTOGRAPHED AT DETREX CORP., DETROIT, MICH.

The hardest-working sander disc you can use is the new Resin Sander Disc by CARBORUNDUM. It cuts fast, free and cool, with maximum stock removal at all times. The resin bond is engineered with greater holding power, and a tough new fiber is used in the backing. As a result, Resin Sander Discs resist both edge-wear and the heat of flat contact grinding. You get more work out of each disc—which soon adds up to impressive savings. Another feature: special moisture-resistant packaging means Resin Sander Discs reach you "factory-fresh"—are easier to store and handle. There's a complete range of sizes and types to fit all Disc Sanders, in 16 through 150 grit. For a convincing demonstration, call your CARBORUNDUM Distributor or salesman. Or write The Carborundum Company, Niagara Falls, New York. In Canada: Canadian Carborundum Company, Ltd., Niagara Falls, Ontario.

Through application "know-how" and product quality

CARBORUNDUM

REGISTERED TRADE MARK

continually puts more sense in your abrasive dollar

You can set a new High Torque Unbrako self-locking socket set screw and forget it—it stays tight

There are several reasons: the deeper socket which gives you better purchase with the wrench; the rounded socket corners which eliminate the sharp corners where cracks start; the special methods of heat treatment in atmosphere-controlled furnaces; the development of fully formed threads.

Up to 40% higher tightening torque—a new Unbrako feature

RECOMMENDED SOCKET SET SCREW TIGHTENING TORQUES (Inch-Pounds)

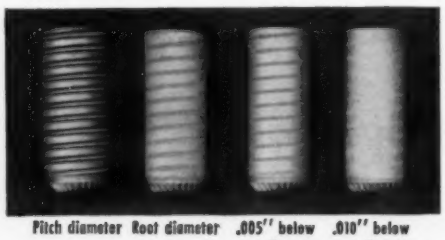
SCREW SIZE	UNBRAKO	SET SCREW B	SET SCREW C	MINIMUM DIFFERENTIAL %
#4	5	3.9	3.5	28
#5	9	7.8	7.4	15
#6	9	7.8	7.4	15
#8	20	14.7	14.5	36
#10	33	26.5	25	25
1/4	87	62	60	40
5/16	165	122	125	32
3/8	290	198	225	29
7/16	430	309	350	23
1/2	620	460	500	24
5/8	1225	1106	1060	11
3/4	2125	1540	1800	18
7/8	5000	3660	4600	9
1	7000	5025	6500	8

ALL UNBRAKOs can withstand higher tightening torques than ordinary set screws. For example, the recommended torque for a ¼" UNBRAKO is 87 inch-pounds—40% greater than that recommended for an ordinary set screw.

These microphotographs illustrate just what fully formed threads do for the new High-Torque UNBRAKO. They make the whole screw stronger. The metal is compressed into the closely knit grain structure that you see. The grain flow follows the contour of the threads. There are no straight lines along which shear can occur. The UNBRAKO retains its flow lines even when ground down to .010" below root diameter. Screws with cut or ground threads lose thread form at root diameter.

You can't buy a better set screw than an UNBRAKO. See your authorized industrial distributor today. Or write STANDARD PRESSED STEEL Co., Jenkintown 17, Pa.

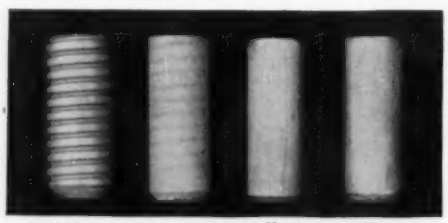
Unbrako Set Screw



Pitch diameter | Root diameter | .005" below root diameter | .010" below root diameter

Fully formed threads make the whole screw stronger. The metal is compressed into a closely knit grain structure. The grain flow follows the contour of the threads. The UNBRAKO retains its flow lines even when ground down to .010" below root diameter. Screws with cut or ground threads lose thread form at root diameter.

Ordinary Set Screw



Pitch diameter | Root diameter | .005" below root diameter | .010" below root diameter

STANDARD PRESSED STEEL CO.

UNBRAKO SOCKET SCREW DIVISION SPS

JENKINTOWN PENNSYLVANIA

REPORT TO MANAGEMENT

Is Small Business in Trouble?

Probably no single element of business has received as much sympathetic attention as has small business.

Some of it is justified—but with limitations. In these days of so much emphasis on so-called big business, compounded by the much publicized merger trend, there is a natural concern over the fate of the small fellow.

But the facts don't bear out any contention that small business is on the way out. There are failures, to be sure, but the general state of small business is good.

It's pointed out by Wendell B. Barnes, administrator of the Small Business Administration, that there are one-third more small businesses now than in 1939. On top of that, there were more new businesses incorporated in 1955 than in any previous year in the nation's history.

Business failures are not dangerously high. Dun & Bradstreet statistics show that over the past 56 years, the failure rate has been 71 for each 10,000 business concerns. The failure rate in 1955 was less than 42 for each 10,000, lowest ever experienced in a normal year.

There's Help, Too

The SBA is providing significant aid too. It has made $126 billion in financing available to more than 2500 small business concerns. This is particularly helpful in that obtaining financing has been one of the major headaches for small business.

And small business firms are slowly getting more business from the direction of government contracts. You can expect them to get more in the future.

U. S. Atomic Energy Commission is stepping up its efforts to get better small business participation. Last year, out of $333 million in contracts, small business received $154 million, nearly half.

The trend is continuing. In the first two quarters of this fiscal year, small companies got $97.2 million out of a total of $208.5 million spent. This is a rate of 46.6 pct, even better than the 45.6 pct in 1955.

The Army is also going to small business. In the first six months of the current fiscal year, $665 million in contracts went in that direction, or 40 pct of Army contracts in that period.

No Whistling in the Dark

You can expect business to keep up its current pace for some time. Available statistics show that '56 is off to a good start, and with little or no letup in sight.

Manufacturers' sales in February were at the same terrific pace of recent months. They hit a total of $26.5 billion, or some $2.5 billion over last February, when many were saying that "it can't last."

New orders did decline somewhat from January, but orders were larger than shipments, so backlogs continued to mount. New orders were $27.3 billion for manufacturers, or $3 billion over a year ago.

Inventories continue to rise, but slowly. After seasonal adjustments, they were $500 million over the previous months, reflecting both higher replacement costs as well as larger volume of goods.

What About Building?

Through February of this year, outlays for new construction were about equal to the rate of last year. But both FHA and VA activity in the field of appraisals for new homes reversed a five-month decline as builders got ready for spring activity.

At the same time, public contracts rose sharply to near record highs. All contracts in January did set a new record.

INDUSTRIAL BRIEFS

Start Rolling . . . The Steel Co. of Canada Ltd., Hamilton, Ont., has awarded contract to the Pigott Construction Co., Hamilton, at $1 million for sheet pilings, excavation and foundations for a new blooming mill to be started immediately. It is part of the company's new $70 million expansion program, and will permit a substantial increase in production of rolled steel products required for the railway, automotive, appliance and containers industries.

Closing Ranks . . . Acquisition of Resin Industries of Santa Barbara, Calif., by the Borden Co. included the consolidated activities of Resin Industries, Resinite Sales Corp., and Grant Chemical Co., all of Santa Barbara. Resin Industries will be operated as a wholly owned subsidiary of the Borden Co. There will be no changes in management or personnel.

With a Smile . . . Packard-Clipper Div., Studebaker-Packard Corp. dealers have expanded their servicing facilities by 25 pct over the past year and are currently spending 30 pct more money for investment in modern servicing equipment, according to Robert P. Laughna, general manager, Packard-Clipper Div.

Engineers Wayne-ing . . . The Wayne University College of Engineering will present an exhibition of progress in engineering education and research called "Engineering Showcase." The "Showcase" scheduled for April 27-28, will include models and displays from all major fields of engineering, ranging from a model nuclear reactor, a wind tunnel for testing supersonic aircraft, the Mackinaw Bridge.

Chemical Reaction . . . Stauffer Chemical Co. plans to build a new sulfuric acid plant, costing approximately $2 million at Dominquez, Calif. Construction will begin within a month, with full scale production scheduled early in 1957. Stauffer Chemical has three sulfuric plants in California, at Richmond, Vernon and Dominquez.

Frozen Virus . . . A 17-cu ft chest freezer is being shipped to the Pasteur Institute in Paris for use in storing the virus from which a new polio vaccine is being made by Admiral International Corp. The order was placed through the company's Paris distributor, Intercontinental Radio Electrique.

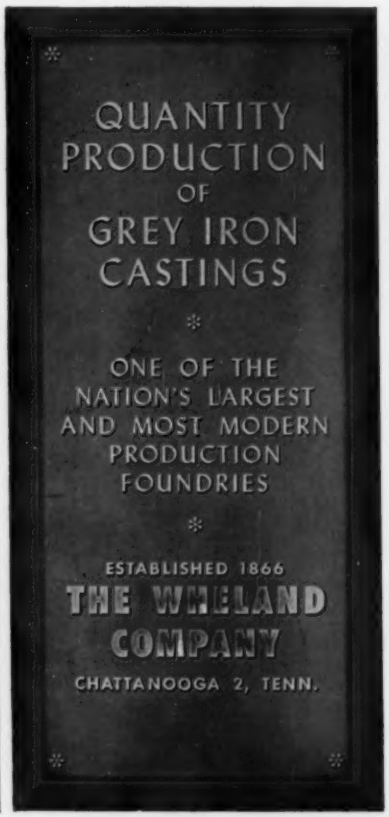
Lift in Dayton . . . Material Handling Systems, Philadelphia, has been named a representative of The Yale & Towne Manufacturing Co. for the sale and service of industrial lift trucks in Dayton, O.

Oriental Oil Country . . . Wildcat drilling to depths below 12,000 ft may be started soon in Japan, where present wells have a maximum depth of less than 6,000 ft. The Teikoku Oil Co. has purchased a Type 110 Rig from The National Supply Co.'s Torrence, Calif., plant. Operations are expected to begin in April or May. It is the first complete rig purchased by the Japanese oil industry since 1937.

So Who's Interested . . . Belgian World Airlines has made an Interline Agreement with Aeroflot, the Russian Airline, enabling passengers on Sabena planes arriving in Prague to fly to Moscow via Aeroflot and utilize that airline's services within the U.S.S.R.

Radioactive Cash . . . Atoms for Peace Awards, Inc., Cambridge, Mass., will make international awards for outstanding contributions to the peaceful uses of atomic energy. It is made possible by an appropriation of the Ford Motor Co. Fund, as a memorial to Henry Ford and his son. Award will consist of medal, accompanied by a cash honorarium of up to $75,000. Winners will be selected from individuals or organizations anywhere in the world.

Good Location . . . The Lima Electric Motor Co., Lima, O., has opened a branch office in Cleveland, to handle equipment sales in the area.

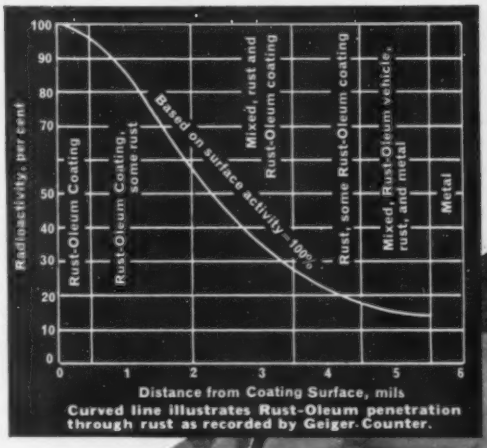


RUST-OLEUM®

PENETRATION

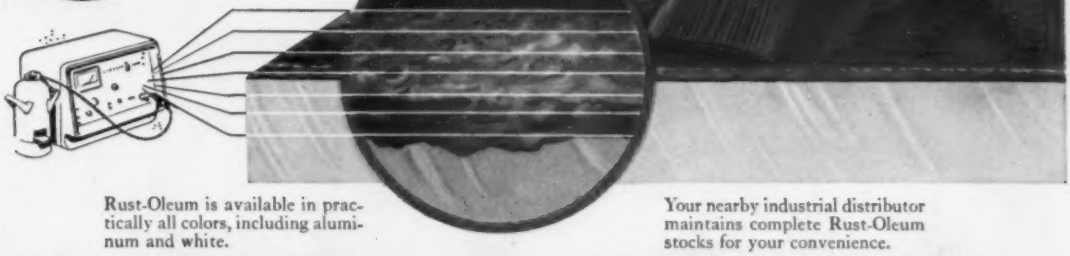
through rust to bare metal traced by Geiger Counter. To effectively stop rust—the vehicle of a protective coating, when applied over a sound, rusted surface—must penetrate through the rust down to bare metal. **Rust-Oleum does exactly that!—as proved by radioactive research!** Rust-Oleum's specially-processed fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Penetration *through rust* to bare metal by Rust-Oleum's specially-processed fish oil vehicle was then traced by Geiger Counter.

You stop rust, because Rust-Oleum's fish oil vehicle soaks deep down to bare metal and into the tiny pits where it drives out air and moisture that cause rust. You save, because this same *penetration* enables you to apply Rust-Oleum directly over rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your letterhead for your thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.



Curved line illustrates Rust-Oleum penetration through rust as recorded by Geiger-Counter.

There is only one Rust-Oleum. It is distinctive as your own fingerprint. Accept no substitute. Buy—and specify only Rust-Oleum. You'll be happy that you did.



Rust-Oleum is available in practically all colors, including aluminum and white.

Your nearby industrial distributor maintains complete Rust-Oleum stocks for your convenience.

RUST-OLEUM®

STOPS RUST!

See our Catalog in Sweets, or write for complete information.

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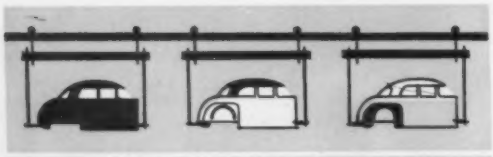
Evanston, Illinois

- ☐ Complete literature including color charts.
- ☐ Thirty-page report on Rust-Oleum penetration.
- ☐ Nearest source of supply.



AUTOMOTIVE ASSEMBLY LINE

Trucks Pick Up As Cars Ease Off

Big 3 produce 1,921,946 vehicles during first quarter . . . Total down from same period last year . . . Cars cut back, but truck production up . . . Highway construction one reason—By *T. L. Carry*.

◆ THE BIG THREE in the auto industry produced 1,921,946 cars and trucks during the first quarter this year. This is 345,276 under the record breaking first quarter of 1955. But it would have been much less if it hadn't been for booming truck production.

With the exception of Lincoln and Cadillac, all car production was cut back. On the other hand, truck production, except for the Ford Motor Co., was increased.

On the surface, it seems puzzling that this should be the case. Trucks are not purchased for the same reason as cars. Buying a truck is strictly a business proposition and as long as it delivers a payload it will be kept in service. Thus, the rate of turnover, although steady, is not as big as it is for cars.

The Reason . . . Why, then, has the production and sale of trucks held up so well in the face of healthy cutbacks in auto manufacturing?

The main reason is that most truck producers were in the midst of model changeovers during the first quarter of 1955 and didn't make as many units as they might have. This year, however, the various companies have been satisfied with facelifts of last year's models and production has stayed at a healthy level. The new models were introduced with no perceptible effect on tempo of the assembly line.

Profitable . . . But like anything else, a company doesn't keep making trucks unless it is selling them. Sales have kept pace with production because of two factors. The first is the normal replacement rate and the second is the opening of new markets.

The rate of building, and of highway construction has increased by leaps and bounds during the past year. As a result, two very broad new markets have opened wider to the industry.

The rate of highway construction is going to increase even more with the expected passage of some form of federal highway legislation this year. Truck producers are gearing their product planning to an anticipated increase.

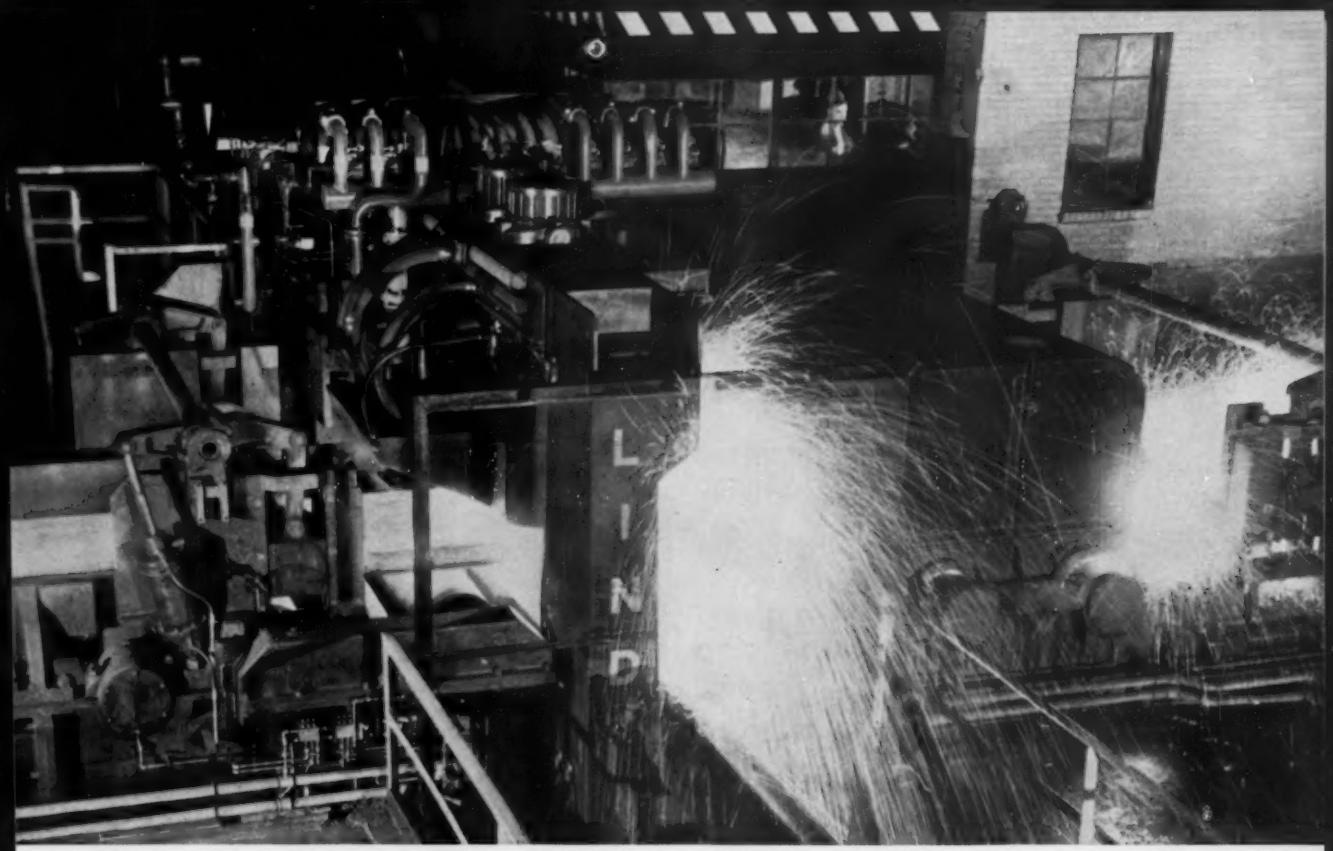
New Equipment . . . Building roads requires the use of both off the highway and over the road equipment. More than one truck manufacturer is planning a more versatile type of heavy vehicle.

The object is to combine the pulling power and slow speed needed for off the road work with the performance and economy required for an on the highway vehicle. Building such a truck is turning out to be a tougher job than some had bargained for. But it could be the coming vehicle for major highway construction.

A Possible Answer . . . Possible solution might be a heavier axle

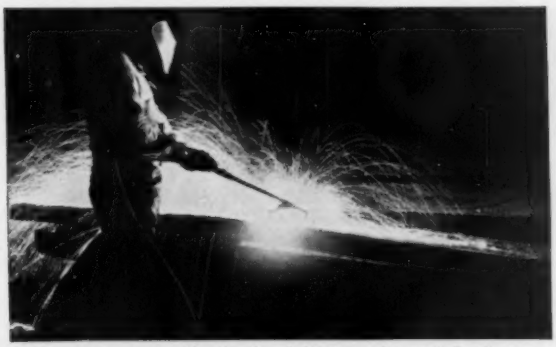
Courtesy of Chrysler Corp.

INSTRUMENT panel of the Plymouth gas turbine test car replaces the familiar oil-gas-water-amp dials with such new items as gas generator speed indicator, compressor outlet pressure, and turbine inlet temperature.



How Great Lakes Steel *planes* quality

144 BURNER JETS automatically plane both top and bottom of slabs to remove surface cracks and impurities.



HAND SCARFER double checks slabs to make certain that any flaws extending below surface are also removed.

Just a dramatic picture of a steel mill in action? Far from it! These sizzling-hot sparks tell another very important story about the special care that goes into making steel at Great Lakes.

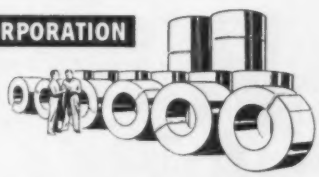
They're bouncing out from beneath the burner jets of the automatic hot scarfing machine. Scarfing? Just as you plane wood to get a smooth, flawless surface, so does the scarfer automatically burn away the top and bottom "skin" from each slab of steel. Then, jets of water sweep the slab clean.

The end result: you get a higher quality, deep-drawing sheet with an inherently flaw-free surface. That's one more important reason why you should call Great Lakes about your steel needs. And remember, Great Lakes customers get what they call for.

GREAT LAKES STEEL CORPORATION

Ecorse, Detroit 29, Michigan • A Unit of

NATIONAL STEEL CORPORATION



District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

NUMBER 1 OF A SERIES

PRODUCTION SHORT CUTS WITH

ZINC

DIE CASTINGS

The RAMBLER puts on its best front!

The completely new 1956 Rambler—by American Motors—features a unique front end assembly styled to endow this compact, economical car with a massive, forward-thrusting look. And this assembly graphically illustrates why ZINC Die Castings are so widely specified by design engineers in and out of the automotive industry.

As you see, the ZINC Die Cast grille is attached to a sheet metal frame before mounting on the car. The grille top molding and the inboard headlamp bezels are then attached to cover the frame and complete the front end. Because such unusual shapes can be die cast, only four castings are required in the assembly (plus the two running-light bezels in the fenders).

Send for your copy

The Rambler front end assembly is further simplified by casting the steel mounting bolts as inserts in the back of both the grille and the molding. These precisely located fastening elements, plus the overall dimensional accuracy of the castings, assure perfect fits every time. Add easy finishability (all of the castings are beautifully chromium plated) and you have the principal reasons why ZINC Die Castings are specified by American Motors engineers.

For possible answers to *your* particular production problems, send for our brochure and contact any commercial die casting company.

The New Jersey Zinc Company, 160 Front St., New York 38, N. Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99+% Uniform Quality) ZINC

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
APR. 7, 1956	145,178	26,171
MAR. 31, 1956	134,390	25,637
APR. 9, 1955	176,554	30,535
APR. 2, 1955	187,418	31,019

*Estimated. Source: *Ward's Reports*

with more widely variable speeds.

Regardless of future planning, annual output of trucks is estimated at about 1.2 million. At this rate, the estimated total production of 7.5 million vehicles this year still looks like a very good bet.

Autos Cool Off

Look for a sharp upturn in the sale of air conditioning units for cars this summer.

Manufacturers are eager to start promoting the units because car air conditioning is still a relatively untapped market. Automakers figure the time is ripe to start pushing.

Substantial price reductions for most units were announced when the new cars were introduced this year. The average price cut is about $100.

In addition, manufacturing know-how has reduced the size of the units. More and more producers are placing the entire unit under the hood, rather than cluttering up the trunk with sections. Some producers are also combining the unit with the car's regular heater, adding to the customer appeal.

Resigns:

Alfred P. Sloan, Jr. steps down as GM Board Chairman.

The resignation of Alfred P. Sloan, Jr., from position of chairman of the board of General Motors Corp. marks the end of an era for the corporation.

Mr. Sloan, who will be 81 in May, is generally credited with setting up the system of management decentralization which has paid off so well for GM. His conception of management is centralized policy, decentralized administration.

An idea of how well the idea worked can be gleaned from the fact that GM's market penetration at the time Mr. Sloan was named vice-president in charge of operations was less than 12 pct. Today, the corporation accounts for over 50 pct of the market.

The fact that other companies in the industry have taken steps to imitate GM's method of operation is tribute to Mr. Sloan's wisdom and business acumen.

Even though he has resigned as chairman of the board, GM will still benefit from Mr. Sloan's services. He will continue as a director of the corporation, a member of the financial policy committee and as chairman of the bonus and salary committee.

Albert Bradley succeeds Mr. Sloan as chairman and Frederick G. Donner will be chairman of the financial policy committee, succeeding Mr. Bradley.

Bright Horizons

In 1956, according to W. C. Flaherty, director of business research for Chrysler Corp., there will be 70 million cars in the United States.

Ten years from now the industry will need to build between 8 and 9 million cars a year to replace those that are scrapped, and to meet increased demands.

Mr. Flaherty bases his predictions mainly on a population of 195 million people by 1965. In addition, he sees a marked rise in the real incomes of American families coupled with an increase in mobility due to better highways and more leisure time.

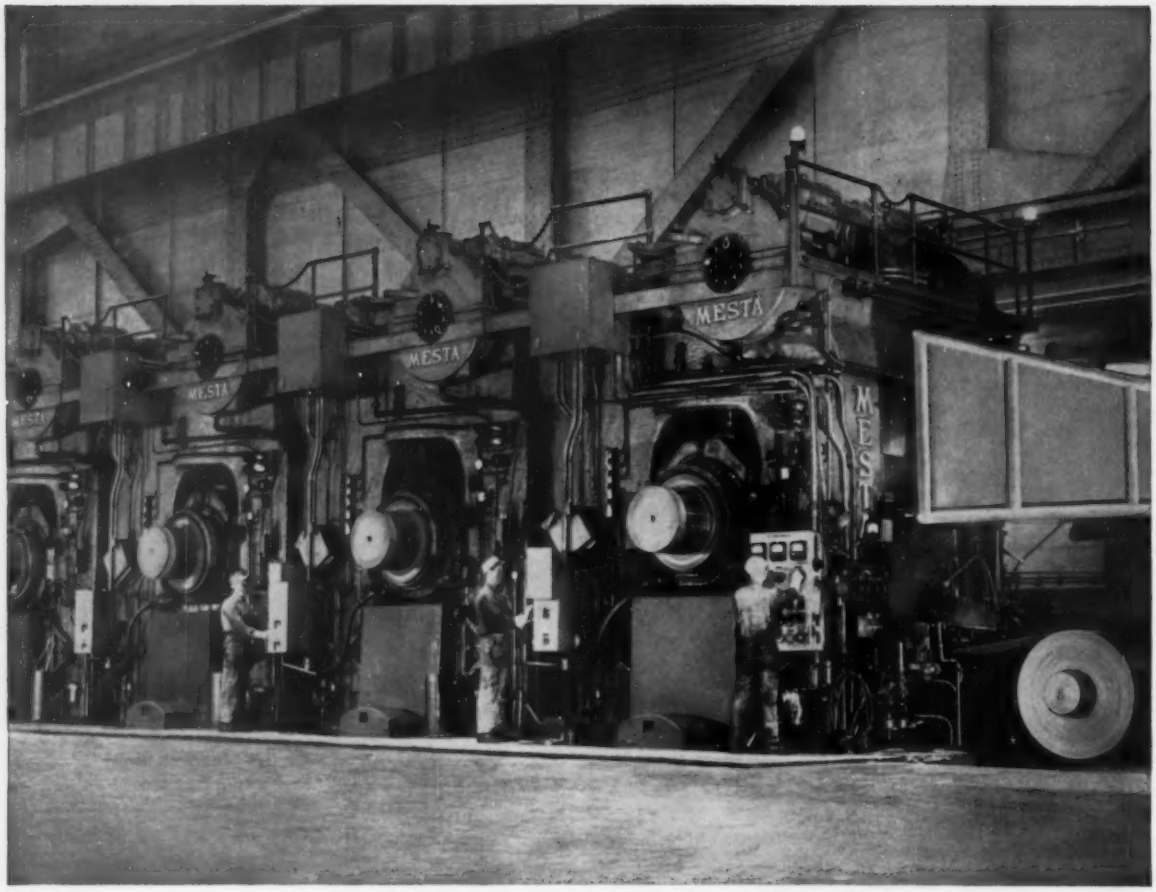
The scrappage rate of cars will reach an annual rate of 5 million in the next decade. Future improvements in autos will have a tendency to obsolete cars at a faster rate.

Although the outlook for the industry is bright, Mr. Flaherty believes the future of individual companies depends on their ability to meet the competitive challenge of the industry.

Administrative and production plans being formulated at present will be the deciding factor in the coming decade. There seems to be no doubt that competition in the industry is heading for an even more furious pace.

THE BULL OF THE WOODS — **By J. R. Williams**

DON'T YOU EVER PULL A TRICK LIKE THAT ON ME AGIN.! I SAW YOU -- I WASN'T NAPPIN'.!
THEY REMAIN GREAT MYSTERIES OF THE SHOP --IT AIN'T ETHICAL TO GO YAWPIN' TO TH' BOSS AN' HE DON'T WANT TH' BOSS TO KNOW WHAT HE DID ABOUT IT, AN' TH' OTHER DON'T LIKE ANYBODY TO KNOW HE GOT CAUGHT AT IT-- OR TH' BOSS TO KNOW HE DID IT.!
AND I NEVER TELL ANY-BODY THAT I WAS A WIT-NESS.! YOU'D HAVE MORE SLEUTHS THAN THEY GOT ON TV ASKIN' YOU "WHY?" "WHAT FOR?" "WHAT DID HE DO?"
MACHINE OIL
4/11
JR WILLIAMS
HEROES ARE MADE-NOT BORN
T.M. Reg. U.S. Pat. Off.
© 1956 by NEA Service, Inc.



Full protection for back-up roll necks

When you use *Texaco Regal Oil* in the circulating systems of your roll stands, you're giving your back-up roll necks the best possible protection. That means smoother, more dependable operation, longer bearing life, lower maintenance costs.

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A Texaco Lubrication Engineer will gladly help you select the proper lubricants to assure the most efficient performance from all your equipment. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

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Next Time Things Won't Be So Easy

Government plans strictest possible metals controls in case of war . . . Theory is that there won't be time for buildup . . . But bureaucrats are getting ready with paper clips and regulations—*By G. H. Baker.*

◆ GOVERNMENT controls over metals in the next war will be the strictest in history. Tough new rules, spelling out in detail the standards for producing metals, are now being written by defense mobilization officials. In addition, other new rules now in the draft stage define the legal end-uses to which metals may be put in time of war or all-out emergency.

It's becoming increasingly evident, so mobilization officials believe, that the production and priorities rules exercised by the federal government in World War II and again during the Korean War are far too free-and-easy for drastic mobilization ahead.

Their reasoning runs like this:

In the three major wars the U. S. has fought within the past 40 years, we've always been lucky enough to have a two- or three-year period for a mobilization buildup, both as to armament and manpower. In a future war, we probably will not be as lucky.

No Time . . . We may not have two or three years to build a tough war economy.

We may not have six months.

It may be necessary to regiment the entire U. S. economy more rigidly than we have ever known (tight regulation of civilians, as well as of the military) in order to exercise supreme military strength.

In the lightning-fast type of warfare that the future holds, no nation will have the luxury of a couple of years to "get ready."

The "get ready" years are already here—now, today.

Bureaucrats Ready . . . A bureaucrat's idea of a "crisis" is a situation where he's caught without file cabinets full of government regulations, questionnaires for industry, and plenty of carbon paper.

With this in mind, the federal agencies that will run the priorities and allocations programs for metalworking industries in the next war are not taking any chances. They've begun to squirrel away boxes of forms, carbon paper, and first drafts of the government regulations applying to metals in a new emergency.

Copies of the priorities and allocations orders that will control usage of metals in the next war are already stored in several locations outside of Washington.

All government departments and agencies now have "emergency headquarters" set up in areas far removed from Washington. Theory is that if Washington is wiped out, the national government will continue operating from multiple locations away from the Potomac.

Copies of wartime regulations, price-control orders, metals allocation regulations and other wartime federal orders are now being stashed away in secret locations against the day they'll be needed.

Ease Writeoffs

Office of Defense Mobilization is relaxing slightly its decision last year to shut off further rapid tax amortization under 25 industry expansion goals.

ODM now will consider granting fast tax writeoffs to firms which had applications on file when the 25 goals were closed last September 29. Earlier, the agency had agreed to consider applications on file when the goals were originally suspended on August 11.

Helicopters Aren't for Just Anybody

▪ You've got to have stars to park your helicopter at the Pentagon these days. Navy captains and Army colonels have to come to work by conventional car.

▪ Air around the Pentagon has become so full of whirly birds bringing high ranking brass to and from work that restrictions became necessary.

▪ In addition to lowering the boom on ranks lower than general and admiral, helicopter traffic regulations are in effect.

▪ Helicopter landing mat is conveniently located on Pentagon's front lawn for easy access from air to chair.

Case No. 107

Harris Steel Co. Reports:

- 4 Years' Trouble-Free Service
- Constant 24-Hour Operation
- Careful Control of Quality

Michael J. Giordano inspects test burner on one of twin Kemp Atmos Gas Producers.

Bright Annealing Furnaces Use Kemp Atmos Gas Generators to Supply Controlled Atmosphere of Uniform High Quality

Bright annealed steel is produced by Harris Steel Company, Kearny, New Jersey, with the help of two Kemp Model 6-MR Atmos Gas Producers. These two Kemp Generators burn city gas, to supply twelve furnace bases with purified controlled atmosphere.

Treating gas 24 hours a day, seven days a week, each Kemp unit produces 6,000 cfh of gas . . . enough to meet the needs of annealing 4,000 to 5,000 tons of steel per month.

User Reports Complete Satisfaction

Mr. Harry Vane, Plant Superintendent, reports "These Kemp units have been in constant service for 4 years without a bit of trouble. The only maintenance needed has been ordinary routine. Because of the constant purity and qualitative analysis of the gas the Kemp Generators produce, we have been able to secure constant control of color, temper and quality of our output."

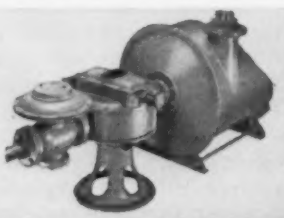
Kemp Can Help You, Too

If efficient, carefully-controlled supply of protective atmosphere gas can help you solve production problems, it will pay you to call in a Kemp Engineer for a detailed discussion of your needs. No obligation, of course.

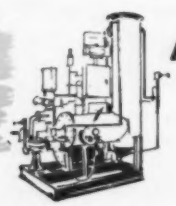
Write to: C. M. KEMP MFG. CO.,
405 E. Oliver Street, Baltimore 2, Maryland.

General view of Harris Steel Co. Bright Annealing Department, showing several of the 12 annealing furnaces supplied with Atmos Gas by Kemp Model 6-MR Generators.

This Kemp industrial carburetor—the heart of every Kemp installation—assures the desired analysis of protective atmosphere gas under any demand without waste . . . without frequent adjustments.



KEMP OF BALTIMORE



ATMOS GAS GENERATORS

ADSORPTIVE DRYERS • SINGEING EQUIPMENT
IMMERSION MELTING POTS
CARBURETORS • BURNERS • FIRE CHECKS

Some 85 applications, involving proposed expansions estimated to cost $139 million, are on file under the 25 goals. Many of the projects, started without tax benefits when the goals were closed, may now get the tax writeoffs.

Discrimination:

Administration warns government contractors.

Firms doing business with the government are on notice that the Eisenhower Administration plans to press its campaign against race and religious discrimination in hiring.

President Eisenhower's Committee on Government Contracts warns firms holding government contracts to consider only "the individual merit" of the applicants for work, and to ignore any racial or religious considerations.

The Committee points out that the rate at which minority workers are to be integrated into offices and shops depends on several factors, including: Amount of turnover in labor force, expansion or contraction of the company's activities, and the availability of qualified applicants.

Examples

Complaint against individual oil refineries charged discrimination against Negro workers. The Committee held a series of industry-wide conferences and as a result, the oil refining industry is making progress in adopting personnel policies and practices which will assure equal job opportunity.

A complaint charged that a chemical company was discriminating against Negro applicants for clerical and skilled positions. The Government contracting agency began an investigation but before it was completed the company revised its policy voluntarily and ended discriminatory practices.

Row Over TVA

The Tennessee Valley Authority's decision to go ahead and build $170 million worth of new steam power plants without asking Congress is stirring up plenty of trouble, both within Congress and within the General Accounting Office.

The GAO says if TVA gets away with this brazen "steal," there'll be no stopping other government agencies that yearn to spend a good deal more money

Rep. John Taber, a top ranking Republican in the House, says the bold stroke shows TVA's "utter disregard for Congress."

TVA executives oppose President Eisenhower. Under Ike, the rapid spread of government power plants and transmission lines has been slowed to a walk. Expansion-minded TVA officials figure they have chafed long enough under Ike, and they've decided to take matters into their own hands.

Contracts:

Big companies get military business.

Military equipment buyers are placing even-greater demands on the productive capacities of America's large corporations, the latest Defense Dept. figures on its biggest suppliers reveal.

Three new lists of the 100 leading suppliers of military goods show the percentage and dollar value of prime contracts they signed in the five-year period ended June 30, 1955, and in recent two-year and six-month periods. Over the five-year stretch, these firms received 62.6 pct of prime orders, valued at more than $77.1 billion.

GM Leads

During the shorter periods the major suppliers obtained an even higher percentage of prime contracts. They were awarded 65.4 pct, for $16.3 billion, from July 1953 through June 1955. From Jan. 1 through June 30, 1955, they received 68.4 pct, for $5.8 billion.

Leading supplier for the five years studied was General Motors Corp., which with its subsidiaries signed contracts amounting to $6.8 billion. North American Aviation, Inc., which rose to the top of the lists in the two shorter periods, was sixth for the full five years, with $3.4 billion in orders.

Included in the top ten suppliers, besides GM and North American, are General Electric Co., General Dynamics Corp., and six aircraft firms. An additional ten concerns had orders of more than $1 billion each in the five-year period.

The Top Ten in Defense Contracts

Company	Contracts (In Millions of dollars)	Pct of U. S. Total	Cumulative Pct of Total
U. S. TOTAL	$123,260.9	100.0	100.0
General Motors Corp.	6,874.0	5.6	5.6
Boeing Airplane Corp.	5,527.8	4.5	10.1
United Aircraft Corp.	4,198.8	3.4	13.5
General Electric Co.	4,003.2	3.2	16.7
Douglas Aircraft Co.	3,909.6	3.2	19.9
North American Aviation, Inc.	3,486.2	2.8	22.7
General Dynamics Corp.	3,109.6	2.5	25.2
Lockheed Aircraft Corp.	3,088.3	2.5	27.7
Curtiss-Wright Corp.	2.221.4	1.8	29.5
Republic Aviation Corp.	2,209.1	1.8	31.3

We just said-

"OUR ENGINEERING SERVICE IS FREE!"

Sometimes you have to be careful how you spring surprises. For instance awhile back one of our good purchasing agent friends called us in to help him lick a tough fastening problem. We licked it all right and naturally he was very grateful.

But the excitement started when he asked what he owed.

"Nothing", we said. "Lamson & Sessions Engineering Service is *Free!*"

Well, that was too much for him—and you can see what happened.

Try "Ell" & "Ess" (that's us) the next time you need help on a fastener problem. But remember that the service is *free*. We don't want to have to revive you, too!

The LAMSON & SESSIONS Co.

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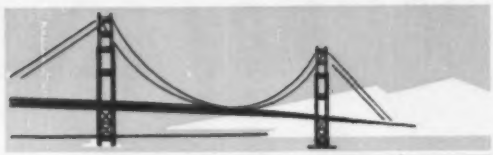


WEST COAST REPORT

West Steel Capacity Heading Up

Latest move is Kaiser's $113 million project for expanding its Fontana, Calif., plant . . . Finished products capacity expected to amount to about 1.528 million tons—By *R. R. Kay.*

◆ FARWESTERN steel capacity is growing by leaps and bounds. And the booming steel market here will gobble up this extra production and probably still clamor for more.

Plans for a $113-million Kaiser Steel Corp. expansion come on the heels of a recent announcement by Columbia-Geneva Steel Div. of U. S. Steel that it will fully integrate its Pittsburg, Calif., Works. And rumors are flying that Bethlehem Pacific Coast Steel Corp. will increase its capacity.

Kaiser's $113-million project at its Fontana, Calif., Works will up finished products capacity from 1.084 million tons to 1.528 million tons. They'll get:

1. An oxygen steel converter plant.
2. A blooming mill.
3. A hot strip mill.
4. More tinplate capacity.

The Fontana plant is the only fully integrated facility now on the Coast. Its present ingot capacity is 1.536 million tons.

Industry's Best Friend

Production uses for industrial diamonds are on the upswing. A West Coast firm now has a diamond chip salvaging method which is putting $1200 per month back in its pocket.

Diamond wheels for sharpening carbide tools lose a lot of chips.

A tool maintenance man at Douglas Aircraft's El Segundo, Calif., Div. figured this out: Put small pans under the grinding wheels. Rig up a mist coolant to direct the chips into the pans. Put sludge that builds up in the pans through a flannel strainer. Dry what's left in an oven. You'll get dirt, pay dirt, for which a diamond wheel maker will pay.

Douglas salvaged 740 carats of industrial diamonds in the first month with this setup.

Save Time, Money

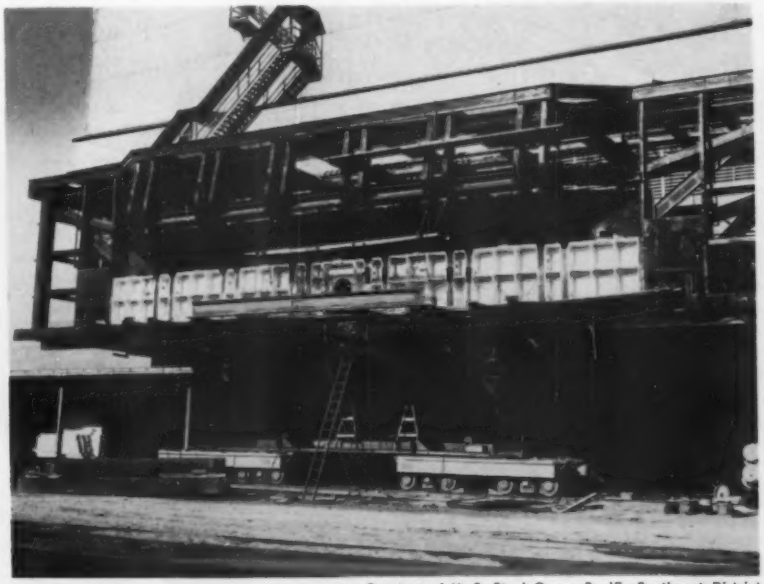
Here's the way Columbia-Geneva Div., U. S. Steel, saves money rebuilding a furnace. The structural steel framework was prefabricated outside the open hearth building and moved into place as a unit.

This idea, tried at the Geneva Works, Provo, Utah, also saved about 15 days down time.

By prefabricating the 475-ton structure, the mill kept the old furnace going for the longest possible time. The entire rebuilding job took 15 days.

Faster, Cheaper

Technical analysis of the latest Mobilgas Economy Run results show a significant trend: horsepower in the high ranges is getting cheaper. Car owners are getting more mileage and power for their gasoline dollar, so says the Run's sponsor, General Petroleum Corp. The annual event puts stock cars through 1200 miles to 1400 miles of rugged road tests in the Farwestern states.



Courtesy of U. S. Steel Corp., Pacific Southwest District

SUCCESS crowned the efforts of engineers at U.S. Steel's Geneva Works, Provo, Utah, to save down time when rebuilding open hearth furnaces. Steel framework was prefabricated and moved into place as unit, saving 15 days.

COMMON SENSE says it's better...

Twin Screw Knee Support

Available under Tool-Lease program

Think it over... twin screw knee support is the one really new basic advancement in knee type milling machine design in years. And only Kearney & Trecker new TF Series machines have it!

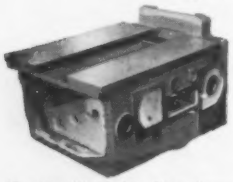
Here's why it makes sense.

Because the *twin screw* design distributes most effectively the weight of much larger, heavier knees, saddles and tables, it fulfills today's requirements for higher speeds, feeds and power — greater machine capacity. What's more, this *balanced design* substantially increases stability under heaviest loads... offers greater resistance to torsional thrust under all cuts... divides the wear factor in half, thus assuring greater, longer-lasting accuracy.

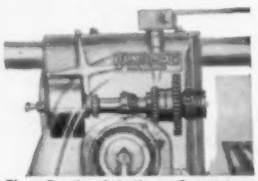
Kearney & Trecker's feature-packed TF Series line of general production machines is available in five sizes — No. 2 to No. 6, from 10hp to 50hp in Plain, Universal and Vertical styles.

Why take less than the latest when you want new milling machines? You can get all the facts on the new TF's from your Kearney & Trecker representative, or write direct to Kearney & Trecker Corp. Mail coupon for new catalog with details on TF Series machines.

5 more reasons why TF Series milling machines are way out front in rigidity

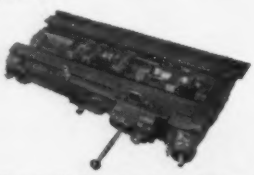


Heavier, Wider, One-Piece Knee — The TWIN SCREW arrangement supports the heavier, larger knee. Span and length of ways is increased considerably, providing fuller saddle support . . . lasting accuracy . . . substantial reduction of way and gib wear.



Three-Bearing Spindle — Complete assembly consists of three heavy-duty bearings, flywheel, a train of wide-faced forged steel gears. Rigidity of spindle unit contributes to increased cutter life, better finish and quieter operation.

Double "Vibra-Void" Overarms — Two solid steel bars, mounted completely through column, void vibration at source, afford more rigidity and resistance to deflection than any other type support. Design also greatly simplifies changing of arbors and cutters.



"Fron-Trol" Operating Convenience — Front-mounted controls include feed selection, Mono-Lever table feed and rapid traverse, automatic cycle table feed and rapid traverse controls, table handwheel, saddle clamping gib and backlash eliminator. Machines have 2" dia. table feed screw.

Massive Column — Solid back, double-box section column is scientifically ribbed throughout to rigidly withstand heaviest cutting forces. Full bearing column face affords maximum support for the knee. Cross-mounted motor assures maximum ventilation, easy access for routine maintenance.

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MACHINE TOOL HIGH SPOTS

How to Analyze Machine Tool Needs

Ford Motor Co. capability tests help make decisions on tool purchases . . . Theory tackles variations in machined parts, fits them into categories . . . Supplements builders' tests—By *E. J. Egan, Jr.*

◆ TAKE THE hypothetical case of the plant that bought two identical machine tools to share the work load on a production job. It didn't take long to discover that the two units were twins in appearance only.

One of them did all that was expected of it in turning out acceptable work. The other? Well, it got the "lemon" label for producing too many parts that were either outright scrap or in need of extensive rework.

And the best operator skills and loving maintenance care couldn't unstick that "lemon" tag. It was there to stay. Why? Because the machine was inherently incapable of producing an acceptable percentage of in-tolerance work. It needed major corrective surgery by way of rebuilding and refitting. That's a time consuming job. It's also an expensive one.

What's the Answer? . . . Is there a way—a sure way—to determine machine tool capability before a customer takes delivery? Test runs in the builders' plants are common, but is the size of the test lot of parts adequate, and are the results evaluated correctly? Probably not, in many cases.

To get the best possible answer about a machine tool's performance capability (or incapability), Ford Motor Co. has a suggestion for builders. The auto firm proposes that manufacturers of such equipment apply simplified techniques of statistical analysis to their pre-delivery test runs.

Ford has made machine capability tests in its own plants for several years. According to Irwin A. De Grote, quality analysis staff supervisor, "analysis of such tests has helped us in making the important decision as to what machine to purchase next time."

Trouble Sources . . . Theory advanced by Ford tackles the variations that occur in any batch of machined parts. They stem from a number of sources, but all of them fit into one or the other of two major categories: (1) those in and basic to the machine tool itself; (2) those caused by conditions "external" to the machine tool.

Workpiece variations that proceed from machine sources are related to the design of the machine, its construction, alignment, end play of components, rigidity and other factors. The external sources that cause process variations are generally the differences that occur between original workpieces, between machine operators, between job setups and other such conditions.

"You'd be surprised how much it increases our sub-zero metal treating capacity."

Gear Index, 1956

January	245.5
February	256.2

(1947-49=100)

Set Limits . . . The auto firm's experience shows that successful-quality production jobs are those in which machine-source variations are not more than 75 pct of the specified tolerance. For example, if allowable tolerance is 0.008 in., a "capable" machine tool would not consume more than 0.006 in. of this range. Carefully planned test procedures would indicate the "probability" of the machine tool variation staying within these limits.

Tests performed and evaluated statistically in the builder's plant would make it more convenient to adjust the machine to "in-range" capability, Mr. De Grote said. He added that the customary test run of 50 or 100 pieces checked against part specifications is not fair to the builder. It does not generally reveal true machine capability for several reasons, one being that it does not separate "external" and "machine" factors.

4500 per hour per machine!

You can't beat Revere Free-Cutting Brass for speed

The mounting nuts shown here are made by the Fischer Special Mfg. Co., Cincinnati 6, Ohio, out of Revere 9/16" hexagon Free-Cutting Brass Rod. Output is 4500 per hour per machine. This phenomenal rate of production is due to special adaptations of standard machines according to Fischer designs and the high quality of Revere Rod. These two important factors enable Fischer to compete price-wise with nuts produced by other methods.

Fischer nuts are chamfered and countersunk on both sides, have no burrs, and are made in sizes from 1/8" to 1-1/16", in various designs, such as hexagon, cap, thumb, spark plug terminal, lighting fixture. As a further indication of the efficiency of the Fischer operation it can be reported that during 1953 the company averaged 244,897 pieces per running hour.

If you machine brass, look into the virtues of Revere Free-Cutting Brass. See the nearest Revere Sales Office.

FISCHER WAFER or mounting nuts, made from Revere 9/16" Free-Cutting Brass Rod at a rate of 4500 per hour.

Revere Free-Cutting Brass Rod has speeded production for many firms, and saved them money.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, New York

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities, Distributors Everywhere

The Iron Age

SALUTES

Alexander L. Feild **Widely known for his research work with stainless steel, this is one researcher who has a full life outside the laboratory. Rooting for son's baseball team is just one hobby.**

The popular concept that a research scientist is devoted entirely to a secluded life in a laboratory just doesn't fit Dr. Alexander L. Feild, associate director for research, Armco Steel Co.

Dr. Feild has spent enough time and effort in Armco's stainless steel lab in Baltimore, of which he has charge, to gain wide recognition for his contributions to the progress of stainless steels. The latest came from the American Society for Metals which named him Sauver Medalist in 1954.

And yet Dr. Feild still finds time to be quite active in the pastimes of ornothology, photography, gardening and collecting high-fidelity classical phonograph records. In fact, ranking almost on a plane with his scientific accomplishments, as far as as Dr. Feild is concerned, is the success he has had rooting for his son Robert's baseball team.

And, this mild appearing dynamo has generated an almost uncountable number of technical papers, obtained a number of patents and is a member of the following societies: American Chemical Society, American Institute of Mining and Metallurgical Engineers, American Society for Metals, American Society for Testing Materials, and both the American and British Iron and Steel Institutes.

Born in Oxford, N. C., Dr. Feild received both a bachelor's and an advanced degree from his home state university. He migrated north for another advanced degree from Stevens Institute of Technology.

He taught school for several years, and then joined the staff of the U. S. Bureau of Mines. He subsequently was associated with several steel companies, primarily in research capacities, before joining Rustless Iron and Steel Corp., Baltimore, in 1931.

Armco Steel Corp. acquired Rustless in 1945, and with the transaction gained the valuable services of Dr. Alexander L. Feild.

Ohio Rolls

shaping metal for all industry

Choose from 12 types of Ohio Iron and Steel Rolls:

- Carbon Steel Rolls
- Ohioloy Rolls
- Ohioloy "K" Rolls
- Flintuff Rolls
- Holl-O-Cast Rolls
- Chilled Iron Rolls
- Denso Iron Rolls
- Nickel Grain Rolls
- Special Iron Rolls
- Nioloy Rolls
- Ohio Double-Pour Rolls
- Forged Steel Rolls

THE OHIO STEEL FOUNDRY CO.

LIMA, OHIO

Plants at Lima and Springfield, Ohio

The Iron Age INTRODUCES

Stanley M. Newbrander, elected vice president, quality control, **Weirton Steel Co.,** division of National Steel Corp., Weirton, W. Va.

Daniel H. Dellinger, elected vice president, quality control, **Great Lakes Steel Corp.,** division of National Steel Corp., Ecorse, Mich.

John E. Eckert, elected vice president and chief engineer, **Armzen Co.,** Waterbury, Conn.; **James F. Fox,** elected vice president and sales manager; **Michael G. Sendzimir,** elected treasurer.

S. M. Hopkins, general manager, South Pacific Div., and assistant to president, elected vice president, **National Can Corp.,** Chicago.

John E. Spears, appointed divisional vice president and acting general manager, Gas and Coke Div., **Koppers Co., Inc.,** Kearny, N. J.

Herbert S. Ide, Jr., elected administrative vice president and treasurer, **Eaton Manufacturing Co.,** Cleveland; **Raymond G. Hengst,** elected secretary and general counsel.

Robert W. Cameron, named assistant superintendent, inspection-finished products, Youngstown district steel plant, **Republic Steel Corp.,** Cleveland.

Charles T. Hapgood, named assistant manager, sales, Pipe Div., **Republic Steel Corp.,** Cleveland.

James M. Veeder, elected vice president and manager, Finance Dept., **Koppers Co., Inc.,** Pittsburgh; **E. A. Berry,** named assistant to president; **Charles G. Strang,** appointed vice president and assistant manager, Finance Dept.

Harry N. Cantrell, named supervisor, computational research, Large Steam Turbine-Generator Dept., **General Electric Co.,** Schenectady, N. Y.

Robert R. Lent, named West Coast Coordinator, Electronics and Instrumentation Div., **Baldwin-Lima-Hamilton Corp.,** Los Angeles.

Ralph I. Swanson, named assistant general superintendent, Roll & Machine Works, **U. S. Steel Corp.,** Canton, O.

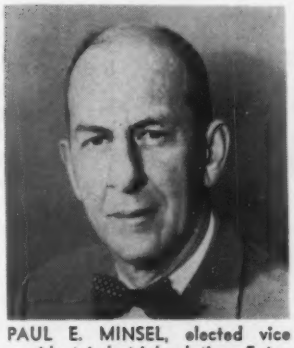
Nick W. Cox, named manager, aluminum sales, **The Korhumel Steel & Aluminum Corp. of Wisconsin; Bernard A. Schultz,** named plant superintendent.

Robert N. Eslyn, named manager, sales planning, **Kennametal Inc.,** Latrobe, Pa.

Garnett A. Vining, named western regional sales manager, Yale Materials Handling Div., **The Yale & Towne Manufacturing Co.**

J. S. Peterson, named manager, electronic sales, Scale Div., **Fairbanks, Morse & Co.,** Chicago.

HOWARD J. McGINN, elected chairman of the board, Ecton Manufacturing Co., Cleveland.



PAUL E. MINSEL, elected vice president, industrial relations, Eaton Manufacturing Co., Cleveland.

RICHARD E. WHINREY, general manager, Ewart Plant, Indianapolis, elected vice president, Link-Belt Co., Chicago.

WALTER R. LOWRY, elected vice president and treasurer, The Beryllium Corp., Reading, Pa.

TOLERANCES ARE TOLERANCES . . . or are they?

L. A. Edwards

ASST. SALES MGR., THE CINCINNATI GEAR CO.

Our customers' gear specifications call for many different and often critical tolerances . . . say .0002" or .0003" or whatever they may feel is required for their product. Unless asked, we don't question a customer's specifications, but in some cases we've wondered why particularly close tolerances were called for — and if they were worth the *added cost*. We had an occasion to talk to one customer recently about some gears they had us make to .0002" pin size limit. This firm also made some of its own gears. We asked this man if they had any trouble adhering to such strict tolerances and he said yes they did, but if their parts were "close enough" they used them anyway!

Now, this hardly seems logical — for if his own gears, made to slightly more liberal tolerances, were satisfactory for the job, he could have saved his company some money by being more realistic in his tolerance demands of us. We're not just trying to be philanthropic; it's a purely practical matter for us: unnecessarily critical requirements force us to enter a higher bid and so make our work more expensive than need be. Thus he paid more than necessary for the gears to do his job, and we ran the risk of losing a good customer. That's why we're always happy to see a customer go over his specifications with a sharp pencil.

THE CINCINNATI GEAR CO.

CINCINNATI 27, OHIO

"Gears — Good Gears Only"

CINTI

John W. Wilson, named manager, Export Div., **Aluminum Co. of America,** Pittsburgh; **Gregory Clement, Jr.,** named New York export sales manager.

Earle L. Kropscott, appointed staff manager, molding materials, Plastics Dept., **The Dow Chemical Co.,** Midland, Mich.

Kenneth H. Brown, appointed service manager, Television-radio Div., **Westinghouse Electric Corp.,** Metuchen, N. J.

Leonard J. Cogan, named sales manager, **Graver Tank & Mfg. Co., Inc.,** Chicago.

C. R. Stempf, appointed manager, Standard Products Section, Export Dept., **Worthington Corp.,** Harrison, N. J.

Following appointments are within the Electricweld Tube Div., **Jones & Laughlin Steel Corp.,** Oil City, Pa.: **Samuel H. Strohm,** appointed general manager, Electricweld Tube Div.; **Dale B. Kennedy,** appointed manager, operations; **Howard N. Scott,** appointed manager, sales, Pittsburgh.

Following appointments are within the Seaboard Coil Spring Div., **Associated Spring Corp.,** Gardena, Calif.: **Howard W. Unkrey,** named plant superintendent; **Randall K. Otten,** named purchasing agent; **William H. Schuck,** appointed consultant product engineer, Sales Estimating Dept.

Robert L. Hall, Jr., appointed wire and cable specialist, construction materials, Mid States District, **General Electric Co.**

Emmet E. McWherton, named manager, employment and personnel services, **Sharon Steel Corp.,** Sharon, Pa.

Peter P. Somerville, named general manager, Wire Rope Div., **Jones & Laughlin Steel Corp.,** Muncy, Pa.; **Ivan N. Latimer,** named assistant general manager.

GEORGE W. NAYLOR, elected vice president and general manager, Koppers International, C. A.

FRED W. RYS, elected vice president and manager, construction projects, Koppers International, C. A.

T. K. WEBB, named financial control manager, Electro Metallurgical Co., Div., Union Carbide and Carbon Corp., New York.

HERBERT KAY, named manager, catalyst development, Climax Molybdenum Co., New York.

THIS PROPOSAL CAN SAVE *YOU* REAL *MONEY*

Reports on capital investment savings on the purchase of Portage 4" spindle Horizontal Boring, Drilling and Milling Machines have been as much as 20%. In addition, the initial saving is only part of the story. When you consider operating expense vs. capital investment . . actual dollars saved are even greater than the initial 20%.

It will pay *you*..in more ways than one..to get a proposal from Portage before making a final buying decision.

Write for the Portage No. 4 catalog.

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(Advertisement)

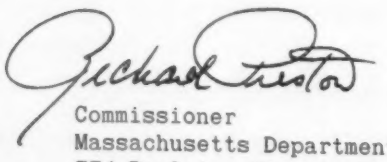
Our Fourth Dimension . . .

The other day a fact-finder dropped into our office to get some information for a client planning to locate an industry in Massachusetts. Talk got around to availability of highly trained professional people — engineers and the like. Our pool of top-level workers is one of the finest in the country, but reluctantly we had to admit that you don't find too many such folks at liberty.

At that point, our visitor made the interesting observation that his client did not consider this to be a major location problem. He went on to explain that in their experience, engineers, technicians and other high-salaried workers in industry throughout the country are eager to come to New England because it is so fine a region in which to live and work and raise a family.

This *livability* is Massachusetts' fourth dimension in the field of economic development. And there is truly gracious living in this old Commonwealth of ours, rich in its incomparable heritage of American history and culture — its superior educational facilities, its delightful variety as a vacationland, its warm homeliness.

We commend this important element of *livability* in Massachusetts to industrialists with plant location problems.



Commissioner
Massachusetts Department of Commerce
334 Boylston Street, Boston 16
(COpley 7-5600)

PERSONNEL

Wilbur Deutsch, named sales manager, Industrial Lubrication Dept., **Aro Equipment Corp.,** Bryan, O.

Wiley J. Pickett and **Arnold E. Blitz,** appointed to technical sales staff, **The Pennsylvania Salt Manufacturing Co.,** Philadelphia.

Federated Metals Div. of **American Smelting and Refining Co.,** New York, announces appointments of: **B. E. Anderson,** named chief engineer, Salt Lake City, Utah; **Arthur F. Kohn, Jr.,** named assistant to general manager, Perth Amboy, N. J.; **Robert D. Mathis,** named superintendent, Los Angeles plant.

William E. Whitehouse, appointed sales representative, Denver, Colo., Laclede-Christy Div., **H. K. Porter Co., Inc.,** St. Louis, Mo.

Robert G. Beeson, appointed railroad development engineer, **Kaiser Aluminum & Chemical Corp.,** Chicago.

Herbert L. Newlin, named purchasing agent, Eddystone Div., **Baldwin - Lima - Hamilton Corp.,** Philadelphia, Pa.

Robert W. Squibb, appointed works metallurgist, **Armco Steel Corp.,** Zanesville, O., Works.

Eugene Salinger, appointed assistant general manager, Riverside Metal Div., **H. K. Porter Co., Inc.,** Riverside, N. J.

William H. Keener, named special representative, Executive Sales Div., **Reynolds Metals Co.,** Washington, D. C.

H. A. Erb, named works manager, Steam Div., **Elliott Co.,** Jeanette, Pa.

OBITUARIES

R. C. Mahon, 65, chairman of the board, **R. C. Mahon Co.,** Detroit.

Harry M. Moses, 59, president, **Bituminous Coal Operators Assn.**

New Balanced Mobil D.T.E. Oils—

Socony Mobil D.T.E. Oils have long set the standard for performance of hydraulic and circulating oils. Today, after many years of continuing laboratory research and several years of exhaustive field tests, we announce a completely new line of Mobil D.T.E. Oils. These are balanced to give much greater resistance to deposits, longer life even at high temperatures, superior wear protection and rust prevention.

These new oils will meet the over-all requirements of your hydraulic and circulating systems *better than any other product.*

★ ★ ★

For further information on how new D.T.E. Oils can improve your production and cut costs, fill out the form below.

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CORRECT LUBRICATION

First Step in Cutting Costs

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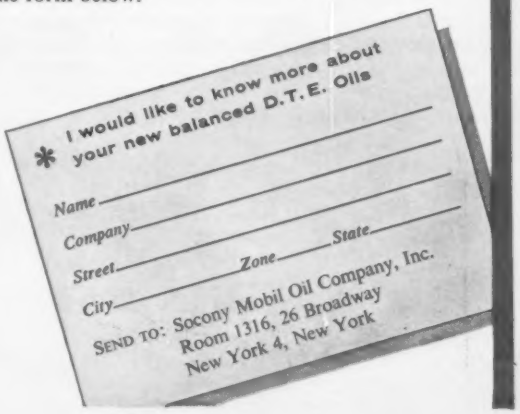
MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION



New LeBlond High Speed Spindle Mounting—front and center bearings are Timkens in cone-adjusted mountings. Center bearing cup is mounted in special adaptor which relieves potential excessive preload resulting from the heat of high speed operation. Rear mounting is thrust bearing.

before you buy a lathe for high-speed carbide turning...check spindle bearing design

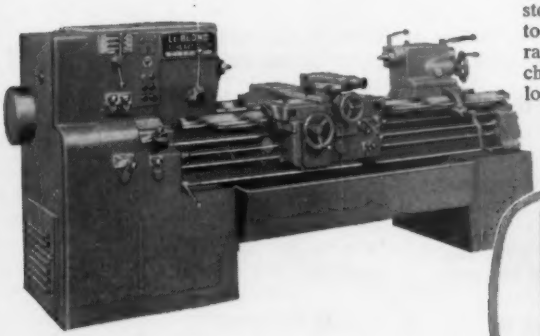
LeBlond construction gives you safe high speeds with long-lived precision. Higher and higher speeds for efficient carbide turning—that's the order of the day in lathe design. But when you talk about 2000 rpm on a 16″ H.D. lathe, you've got to think about the new problems created by high speeds.

Heat, generated in a hurry, produces different rates of expansion radially and axially in the bearings and spindle. As a heavy spindle is revved up to 2000 rpm, heat is generated in the bearings. Expansion occurs radially in the bearings and spindle before the heat has time to dissipate and cause a proportionate axial expansion in the spindle. *This is the dangerous interim period!* Unless the bearings can be relieved, excessive preload may cause undue wear and loss of precision. Even failure in the extreme case.

Here's how LeBlond solves this problem. The front Timken bearing is mounted on the spindle and directly in the headstock. The center bearing cup is mounted in an adaptor Ⓐ whose land is .004″ smaller in diameter than the headstock bore. The other end of the adaptor is press fitted. As the bearing temperatures rise in operation, the center bearing and adaptor expand radially into the slight clearance. Both front and center bearings are thus relieved from extreme preload—failures due to excessive tightness and wear are eliminated. The original factory-set preload can handle both high and low speeds—no need to reset bearing adjustments in the field.

This is typical of the under-the-surface quality engineered into every detail of LeBlond Lathes. To give you the operating speeds you need, with the safety, precision and long life you expect when you purchase a LeBlond.

Whatever your turning needs, high speed, high horsepower or high production, LeBlond has a lathe in its complete line to do the job. 76 different models to choose from. See your LeBlond Distributor or write today.



Other important features of the new LeBlond 16″ Heavy Duty Lathe include combination gear-belt drive headstock, 18 geared speeds, 9 timing-belt-driven speeds up to 2000 rpm, free running spur gear design, four-way rapid traverse, one-piece apron, totally-enclosed quick-change box, hardened and ground steel bedways, thrust-lock tailstock. Ask for Bulletin HD-126C.

. . . cut with confidence

LeBLOND of Cincinnati

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World's Largest Builder of a Complete Line of Lathes • for more than 69 years

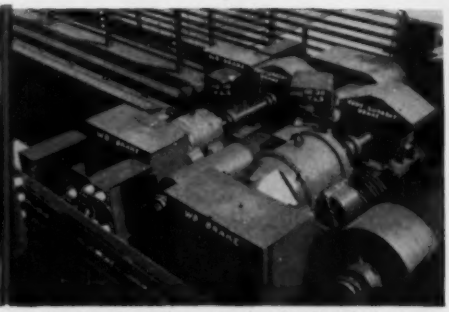
Now... It can be done SAFELY with A-c

Gantry crane serving fabricating division of large steel company.

The EC&M "EDDYMAG"® A-c Hoist Control makes operation SAFE and gives performance comparable to D-c

EC&M Frequency Relay & EDDYMAG Controllers & TAB WELD Resistors combine to insure trouble-free operation.

EC&M Cam Master Switches are easy operating and have short throw.



Crane Trolley fully equipped with EC&M Brakes and Hoist Limit Stops.

There couldn't be any delay! Heavy structural sections must be loaded into cars for shipment to the construction site . . . on a rigid schedule to insure erection within contract-time.

Plant management and company engineers knew the conditions under which this crane was to operate. The installation is remotely located from main-plant power, and situated apart from the routine attention of a regular maintenance crew . . . the crane must be operable in the standard manner, each control point giving *safe, stable speeds.*

Here are the reasons why this A-c Crane is completely EC&M equipped: EC&M is recognized as a leader in Crane Control. EC&M Apparatus has earned a reputation for dependability. Study shows that EC&M A-c circuits and engineering provide maximum safety with simplicity. When control problems arise, make it a point to consult with EC&M.

It pays to "Specify EC&M Control"

THE ELECTRIC CONTROLLER & MFG. CO.

Division of Square D Company

4498 Lee Road • Cleveland 28, Ohio

FEATURE ARTICLES

For modern foundries—

Cure Cores With CO_2 —In Seconds

Fig. 1—Standard muller mixes sand. Tin can (right) gravity feeds sodium silicate to mix.

Fig. 2—Operator actuates core blower to feed sand mix from the hopper to core box below.

◆ Just 15 seconds needed to cure a 3-lb core—20 seconds for a 10 pounder . . . That's one shop's experience in curing cores with CO_2.

◆ Hard and sound, CO_2 treated cores are cured right in the core box . . . That means improved dimensional accuracy . . . Low unit cost is another CO_2 selling point.

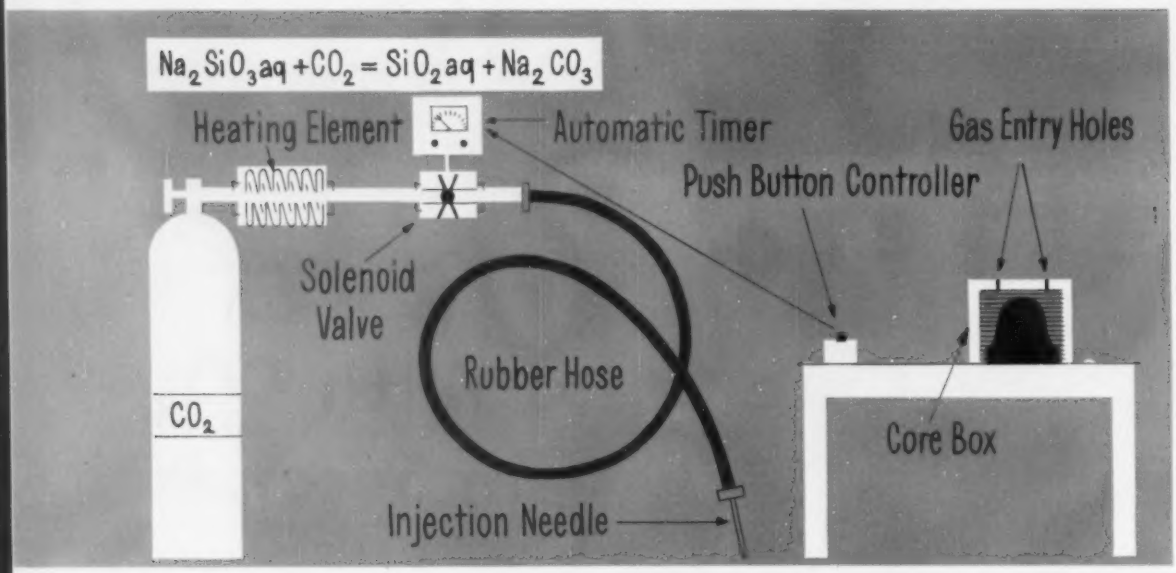
By P. M. UNTERWEISER, Metallurgical Editor

◆ IN THE MODERN FOUNDRY, carbon dioxide is beginning to play a new, and economically important, role. New CO_2 tanks are now beating a path to the core-making department.

After the core-maker completes his handful of tests and trials, these new bottles of the well known fire fighter make a habit of staying around—on a permanent basis.

For CO_2 core curing is as fast and as profitable to the core room as it is startling to the observer watching it go through its paces for the first time. Comparing the new technique to slower and more conventional core baking is just a matter of finding enough superlatives and putting them in the right places.

CO_2 core curing is practically instantaneous.



Reason: it stems from a simple and very rapid chemical reaction. To begin with, sodium silicate is used as a core sand binder. When CO_2 comes into contact with the silicate a chemical breakdown occurs.

Cores cure rapidly

The silicate is rapidly transformed into colloidal silica gel. Along with this chemical reaction, the core sand "hardens" or cures. In a matter of seconds, the fully cured core is ready to go to work in the foundry. Anything faster would probably have to be jet-propelled.

Although still a novelty in the U. S., CO_2 curing is fairly old business in Europe—especially in the Soviet Union. It is mentioned in a British patent that dates back to 1898.

U. S. interest in the process is of rather recent vintage. But, as is so often the case, a late start is no true measure of enthusiasm. And U. S. foundries are long on enthusiasm.

Typical of those foundries really "sold" on CO_2 curing is that operated by the Gamon Meter Div. of Worthington Corp., Newark, N. J. A medium-sized foundry devoted exclusively to bronze (or leaded red brass) castings, Gamon Div. started tinkering with CO_2 just about a year ago. For the past three months CO_2 has

Fig. 3—After core box is properly filled, operator inserts two steel rod stiffeners.

Fig. 4—Core box is placed on gas-feeding fixture for 15 second CO_2 curing cycle.

been a regular production item, and *all* production cores are now CO_2 cured.

Gamon's exclusive product is a water meter. Industrially, of course, there is no such thing as a single, standard-size pipe for all applications involving water. So Gamon's meters are made to suit the usual variety of pipe sizes, ranging in diameter from ½ to 8 in.

Casting quality is high

Its daily production is far from trifling, so that wild-eyed experiments on a production basis are less than unlikely. In a single day, Gamon Division's foundry produces about 28,000 lb of saleable product.

The end product is a water flow-meter that measures and records the passage of water in both gallons and cubic feet. But taken apart piece-by-piece, Gamon's meter is first and foremost a clutch of quality castings.

Since product requirements insist upon moderate corrosion resistance and adequate strength, castings are made of a copper-base alloy commonly referred to as "ounce" or "composition" metal. Technically, the alloy is a leaded red brass with a nominal composition of 85 pct Cu, 5 pct Zn, 5 pct Sn, and 5 pct Pb.

Leaded red brass is a very old and highly dependable metal that most engineers know as SAE-40. As any good textbook testifies, it is an alloy that is ideally suited for low-pressure valves, pipe fittings, small gears, and pump castings. From a production standpoint, it is particularly appreciated for the soundness of its castings and its excellent machinability.

Unlike the grandiose-type experiment, Gamon's exploration into CO_2 core-making involved little more than a shoe string investment. Even with present-day scheduling of over 1000 meters every 24 hours—and omitting the cost of core boxes—not more than $250 worth of CO_2 core-making equipment is involved.

This splinter-size investment actually takes the place of more than $15,000 worth of conventional core-making equipment. Obviously, it's the kind of substitution that warrants a broad smile in anybody's cost reduction program.

In the beginning, it took a lot more than smiles to create the first successful core that matched production requirements. Gamon's general superintendent, E. F. Baerenrodt initiated the program and has been living with it ever since.

In retrospect, he remembers plenty of problems. None of them, fortunately, proved insurmountable. There were problems that involved not only the basic materials but core design considerations as well. Would all of the old production core boxes do? Could they be readily adapted? If so, how could the CO_2 gas be most effectively introduced? Most of all, could the experiment—however promising—be readily translated to everyday production needs?

Ready for use in seconds

It took a while to come up with all of the essential answers. But Gamon's present core-making capacity proves that the initial experiments were well worth the effort.

Their foundry now produces a variety of cores ranging from 3 to 10 lb in weight. Curing time, thanks to CO_2 technique, never exceeds 25 sec for a 10-lb core. The 3-lb variety can be perfectly cured in about 15 sec. With-

Fig. 5—Gas curing is automatically terminated. Operator removes upper half of core mold.

Fig. 6—The finished core is now ready to go to work. Storage for 2 weeks is not harmful.

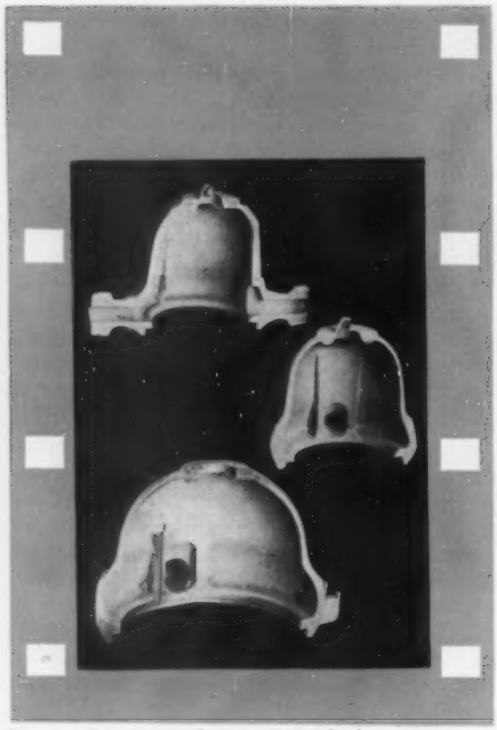


Fig. 7—Interior surfaces of finished castings are clean and smooth—free of glass droplets.

out straining, the core room can now produce at least 600 cores in a normal 8-hr shift. And every core produced can be put to work in the foundry just as soon as it's made.

Successful core making—regardless of curing technique—begins with an optimum sand mix. CO_2 curing requirements, of course, determine some of the more important mix ingredients. For its own casting needs, Gamon is obtaining best results with a mix containing 100 lb E sand, 2 lb iron oxide, 2 lb pitch, 2 lb Stevens sand conditioning oil, and 6 lb CO_2 set (sodium silicate). This mix is intended for mechanical ramming only.

Ingredients are mulled

With the exception of the sodium silicate, all of the ingredients are dumped into the mixing trough of a standard muller. The liquid silicate is placed in a drip can over the mix. It is gravity fed to the rotating mix, thus providing even distribution throughout the sand mass.

Experience indicates that the sand conditioning oil serves a number of important functions. For one, it helps extend the core life during periods of storage. It also promotes the cleanliness of both core box and core blower working surfaces.

Most important of all, the conditioning oil tends to prevent the formation of glass droplets on the molten metal surfaces which come in contact with the core during casting. When such droplets are formed, they adhere tenaciously to the casting and vastly complicate surface machining.

After the sand mix is properly prepared, it is ready for the core boxes. When the boxes are packed mechanically, the sand is fed through a hopper positioned above the core blower. Otherwise, the operation is entirely manual. Depending upon core size and other requirements, both procedures are used.

Gas feeds uniformly

When packing is completed, CO_2 is distributed evenly throughout the core box area for best curing results. No doubt, there are a number of satisfactory methods for introducing the gas. Gamon uses a needle to feed the gas into minute and carefully located holes distributed over the outer surfaces of the core box.

The number of holes or entry vents required is apt to vary considerably, depending upon core geometry. Ultimately, there must be at least enough entry points to guarantee uniform and complete gas dissemination. Cycling is arranged to permit curing one core while another is being blown.

The CO_2 gas does not feed directly from the bottle. It first enters a length of tubing surrounded by an electrical heating element. The heating element serves to raise the gas temperature and prevent freezing of the volumetric control equipment further along the line.

Timer controls gas flow

At about 20-lb pressure, the gas then travels to a release valve actuated by both a solenoid and an automatic timer. This timing arrangement provides both volumetric uniformity and maximum gas economy. It guarantees that the operator can feed only a predetermined amount of gas to any one entry vent.

The combination of constant line pressure and automatic timing provides foolproof control. When the time cycle concludes, a solenoid closes the feed valve automatically. Thus, there is no gas wasted and each core receives the same amount of gas.

A 50-lb bottle of CO_2 supplies enough gas to cure from 900 to 1000 3-lb cores. In the Newark area, the average price for bottled gas is about 8¢ per pound. Price is apt to vary, depending upon location. If you can justify buying in tank car lots, this price is halved. Based on these figures, curing costs would range from 0.2 to 0.4¢ per core. At that price, it's hard to think of a better reason for the growing popularity of CO_2 curing.

AIR gages check finished worms. Panel is linked to grinder for automatic wheel adjustment.

Save costly handling—

Single Grinders Work Three Times Faster Than Pairs

BY W. G. PATTON, Engineering Editor

◆ Finish grinding parts on two machines means extra handling, loading and unloading . . . Saginaw Steering Gear Div. triples worm grinding output per square foot of floor space by substituting one machine for each pair formerly used.

◆ Besides saving time, the firm grinds its precision power steering gear components to closer tolerances . . . Post-operation air gaging feeds part-size information back to the grinder . . . Multiple wheels are automatically dressed and adjusted to compensate for wear.

◆ PRODUCTION of power steering units is a fast growing manufacturing operation with strong emphasis on precision.

At its No. 2 plant, Saginaw Steering Gear Div. of General Motors Corp., makes and tests each of more than 5000 power steering units per day. Here are some typical finish-grinding tolerances on the all-important steering worm:

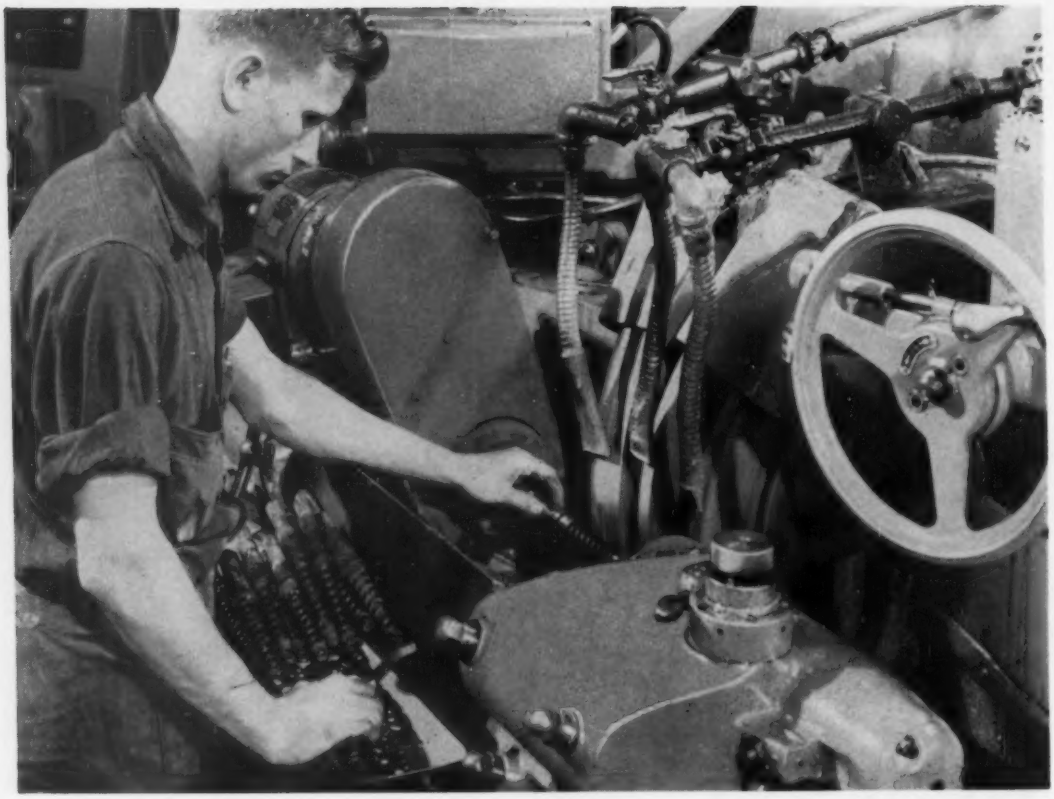
1. One critical diameter is held to 0.001 in., another to 0.002 in., and third to 0.003 in.

2. Runout at three specific diameters and also on the worm pitch circle must not exceed 0.002 in. total indicated reading when the worm is supported on centers.

3. The thread on the worm must be square with the centerline of the part.

4. One shoulder must be square with a 1.000-0.997 in. diam. within 0.0005 in. TIR at 1.170 diam.

5. A full size thread is maintained for 300



WORMS for power steering assemblies are hand loaded into multiple wheel grinder.

degrees to 360 degrees of lead, both sides of center. The thread is gradually blended from full size at the centerline of the worm to undersize at both ends. (This is to reduce steering friction after the wheel moves away from the straight ahead steering position.)

Air gaging follows final grinding of the worm. Wheel corrections, if any, are fed back automatically to the grinding wheels. Not more than one part can be produced outside specification limits before a correction is made.

There are other advantages in using separate, rather than built-in gaging equipment, according to Saginaw Steering Gear engineers. They include (1) cleanliness and freedom from vibration, (2) ability to produce parts while adjusting gaging equipment.

Further evidence of the precision requirements of the job is the fact that all steering assembly worms and nuts are gaged and sorted into 19 different size classifications for accurate matching. After inserting the circulating steel balls and assembling, units are torque tested 100 pct. Torquing limits are held within 2½ to 5 in.-lb.

Prior to tooling up for the new 1956 power steering units, each worm was finish ground in two separate machines. This setup was slower and less accurate than the present method. It also required the handling of parts between machines. With the new setup production per square foot of floor space has been multiplied more than three times. Tolerances have been tightened but the percentage of parts needing rework has been drastically reduced.

Before finish grinding, worms are machined from hot rolled SAE 5120 steel and are then carburized to Rc 62 hardness.

Grinds six surfaces at a time

As shown, the new precision grinding machine has three 30 in. diam form grinding wheels which finish grind four critical diameters and two shoulders simultaneously. Each of four machines produces 75 pieces per hour at 80 pct efficiency. Surface finish is held to 20 microinches in critical areas.

To minimize wear on the grinding wheels and reduce the possibility of wheel breakage, both of the grinding wheel heads feed in at an angle of 14°. Single point wheel dressing equipment operates automatically after each lot of 35 pieces have been produced. The dia-

OPERATIONS PERFORMED ON STEERING WORM

1. Mill to length and center both ends simultaneously. 2. Stamp heat code on end of shaft. 3. Coin centers in both ends. 4. Turn, chamfer and undercut. 5. Rough turn 0.822 diam, 0.670 diam and chamfer. 6. Grind ball groove end. 7. Drill ¼ in. diam hole, 5.56 in. deep. 8. Semi finish-turn diameters. 9. Drill 3/16 in. cross hole and mill keyway. 10. Roll serrations. 11. Hob ball thread. 12. Carburize, draw and sandblast. 13. Anneal serrations. 14. Hone centers and straighten. 15. Grind ball thread. 16. Lubrite. 17. Grind 4 diameters. 18. Grind "V" thread. 19. Buff. 20. Burnish ball grooves. 21. Inspect.

Movement of the head is accomplished by means of a vertical piston which flattens a bowed flat spring. When the spring has straightened out, spark-out occurs, after which the wheel returns to starting position.

Maximum spring movement of 1/16 in. permits a reduction in cylindrical diameter of ⅛ in.

A metering valve controls the rate of feed for rough or finish grinding. And wheel heads are adjustable laterally as well as in and out.

Dresses wheels at any angle

The automatic contour dressers can true the grinding wheels at any angle, or perpendicular to the wheel spindle for accurate grinding of faces and shoulders. Each dresser is actuated by a hydraulic cylinder, controlled by a four-way solenoid and metering valves.

The diamond holder of each dresser unit is connected to a main slide that carries a contour cam and a wedge-shaped feed cam. Through an arrangement of auxiliary slides and followers, the contour cam moves the diamond slide in and out with respect to the face of the grinding wheel.

At the same time, the diamond feeds across the wheel under the control of the wedge-shaped cam. Flat surfaces on the wedge-shaped cam stop the lateral movement of the diamond at points where the wheel is dressed vertically.

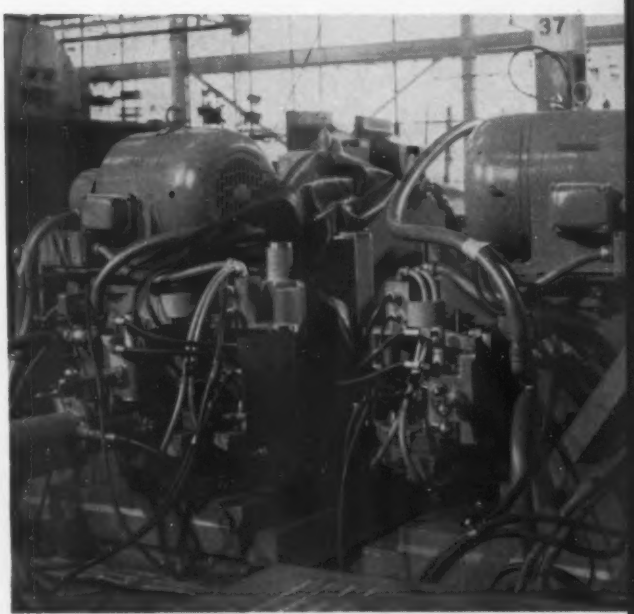
mond equipment dresses both the face and the size of the wheel. Compensation for wheel dressing is automatic.

These multiple wheel units were especially designed for production finish grinding of parts having a number of cylindrical surfaces, faces and shoulders.

When the cycle button is operated, each wheelhead goes through the following movements: (1) rapid traverse to the work, (2) controlled, diminishing-feed movement, (3) an adjustable time delay for spark-out, (4) rapid return. In this setup, both heads operate simultaneously but are separately controlled.

The angularly positioned wheel heads can be equipped with wheels up to 10 in. face width and 30 in. diam. A 15 hp motor, running at 1800 rpm, drives each head through 5 V-belts. Wheels may be solid or narrow and may be spaced, as required, to suit the application.

During rapid traverse, each wheel head and its slide moves as one unit on the sub-base to within 0.001 in. of the work. At this point, a hydraulic valve is actuated to permit the wheel head to move forward. This movement is independent of the slide, which remains stationary.



AT rear of grinder are spindle drives, connections from gages for automatic wheel adjustment.

For heat treaters—

New Furnace Combines Annealing, Vacuum Degassing

◆ Vacuum equipment for heat treating operations could mark a new and important trend . . . Where metal degassing is a factor, vacuum furnaces offer a number of distinct advantages over the more conventional techniques.

◆ A manufacturer of electronic power tubes put a vacuum furnace to work on the annealing and degassing of steel rings . . . The experiment proved to be a significant cost saver, helped reduce part rejections to a minimum.

◆ VACUUM DEGASSING steel rings used in electronic power tubes helps improve performance characteristics as well as provide a virtually gas-free metal. Since the steel rings operate at elevated temperatures within the evacuated portion of the tube, any gas released during service would tend to affect the vacuum adversely.

One of the first large scale uses of vacuum heat treating in the electronics field, this degassing installation is now in operation at Raytheon Mfg. Co., Waltham, Mass. The equipment was designed and built by High Vacuum Equipment Corp., Hingham, Mass.

Among other advantages, the new equipment is cutting operational costs, increasing degassing capacity, and markedly lowering the tube reject rate. The operation involves a 1000 lb capacity batch-type furnace which simultaneously degasses and anneals.

Steel ring degassing was previously accomplished by hydrogen firing to replace heavy gases, trapped in the metal during refining and forming, with a lighter gas that could be more readily pumped off during tube evacuation. Hydrogen costs for this process averaged $2-$3 per hour. Possibility of explosion was a day-to-day hazard.

Degassing the steel rings is handled in a 36 in. x 48 in. vacuum-tight retort made of Inconel. The retort is heated in a furnace to 1850°F for 6-8 hours under high vacuum conditions. Combined effects of high temperature and vacuum allow the steel to release low temperature impurities along with such gases as nitrogen, hydrogen, and oxygen. Were these impurities to evolve during tube operation, they could put it out of service.

Use retort-type furnace

The vacuum furnace is a double pumped, retort-type furnace with a hot chamber in the bottom half and a cooling chamber in the upper section. Both chambers lock together to form a vacuum-tight cylinder within which a fixture carrying the steel rings can be lowered for heating or raised for cooling while under vacuum.

In operation, the upper section of the retort containing the loading fixture is moved from

the furnace by an overhead hoist to the loading station. The fixture is lowered by its own motor-driven hoist, and loaded. The fixture and work are then raised into the upper retort section, which is moved into position over the lower retort section. Then the vacuum seal is remade.

After the sections are secured, a vacuum of 2-3 x 10^{-4} mm Hg is created. At this point, the work is loaded into a retort in the bottom or hot zone of the furnace. Heat is then applied.

Pressure is equalized

Vacuum is controlled in such a way that the gas pressure inside the furnace remains below 1 micron at all times during the degassing cycle.

To keep pressure on both sides of the retort about equal, the furnace has a double vacuum pumping system that evacuates both inside the retort and outside between the retort and the refractory wall. This is an extra precaution to protect the loaded retort during the heating cycle. The retort is made of Inconel plate which stands up well under rigorous cyclic heating and cooling.

The electric furnace is an 84 KVA unit supplied through three transformers and three sets of magnetic contactors. Heat is supplied by Nichrome V rods on the inside of the refractory walls. Two controlled zones keep furnace temperature uniform.

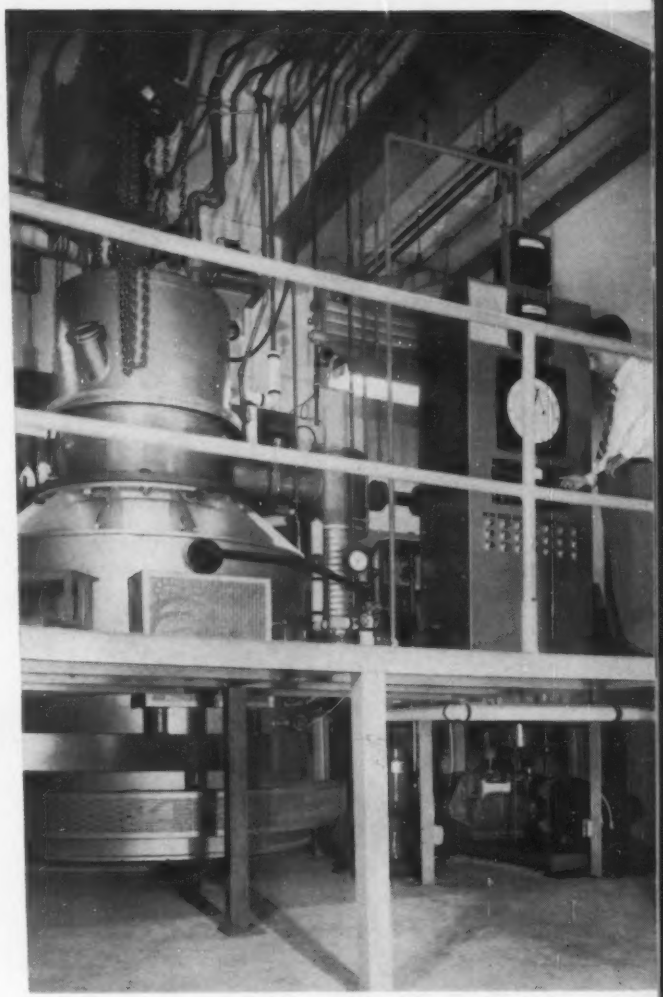
Degassing is rapid

The final degassing temperature (1850°F) is reached an hour after pump-down. The work is then allowed to remain long enough for impurities and gases to evolve from the steel.

After degassing, heat is turned off and the furnace is allowed to cool to about 1200°F. Parts are then raised into the upper cooling section where cold water circulates in coils. When the work temperature is below the point of possible oxidation, the vacuum seal is broken. The work is then removed from the furnace and another cycle is ready to begin.

Vacuum for the furnace is supplied by means of a Hi-Vac 10 in., 3-stage fractionating diffusion pump. The pump has a speed of 3000 cfm at a pressure of 1 micron. A combination roughing and backing Kinney mechanical pump serves as a holding pump after the vacuum is attained. Vacuum around the outside of the retort is handled by another Kinney pump with 13 cfm capacity.

Controls include a potentiometer and controller calibrated for 0-2000°F control. Switches serve to operate the pumps and a 10 in. electropneumatic high vacuum valve. A two-position thermocouple-ionization gauge control is used for reading vacuum and rate of gas evolution. Vacuum controls are interlocked to prevent operation of the diffusion pump except at those times when the mechanical pump is in operation.



NEW 1000 lb capacity vacuum furnace anneals and degasses steel rings on mass production basis.

Although the furnace is in constant, 24-hour operation, it has required only routine maintenance over a two year period. In addition to solving the important steel ring problem for vacuum tubes, this type of furnace has many other potential applications. A number of heat treating possibilities are now under investigation.

Future potential is bright for furnaces capable of providing both the protection afforded by vacuum together with the advantages of degassing facilities. In addition to heat treating applications, a number of brazing jobs now take advantage of this technique.

FEEDER CONVEYORS, some direct chutes carry scrap from press room floor to this 54-in. main conveyor. Main conveyor, in turn, discharges to a high-speed conveyor en route to the baler.

No "blind" areas—

One Man Pulls Strings On Giant Scrap System

BY HERBERT CHASE,
Consultant, Forest Hills, L. I., N. Y.

◆ Scrap from a wide range of stamping presses is removed fast and efficiently by a streamlined system at Chrysler's Automotive Body Div. plant . . . One man controls entire system from central station, aided by TV, mirrors.

◆ Scrap drops through chutes adjoining presses . . . Cross-plant conveyors beneath feed it to 458-ft longitudinal conveyor, thence to vertical conveyor, baler, and waiting gondolas . . . While not snagproof, system works extremely well.

◆ SCRAP HANDLING can be a major headache in a large stamping plant. Scores of presses produce a wide variety of work on a high production basis — and scrap must be gotten away fast. Otherwise scrap pileups could halt the whole production operation.

To meet its massive scrap removal problem, Chrysler Corp.'s Automotive Body Div. plant in Detroit recently revamped its entire scrap-handling system. The problem was a considerable one. The plant turns out a full range of body components for cars of different makes in the Corporation's lines, ranging in size up to stampings as large as complete roof panels.

Drops through floor

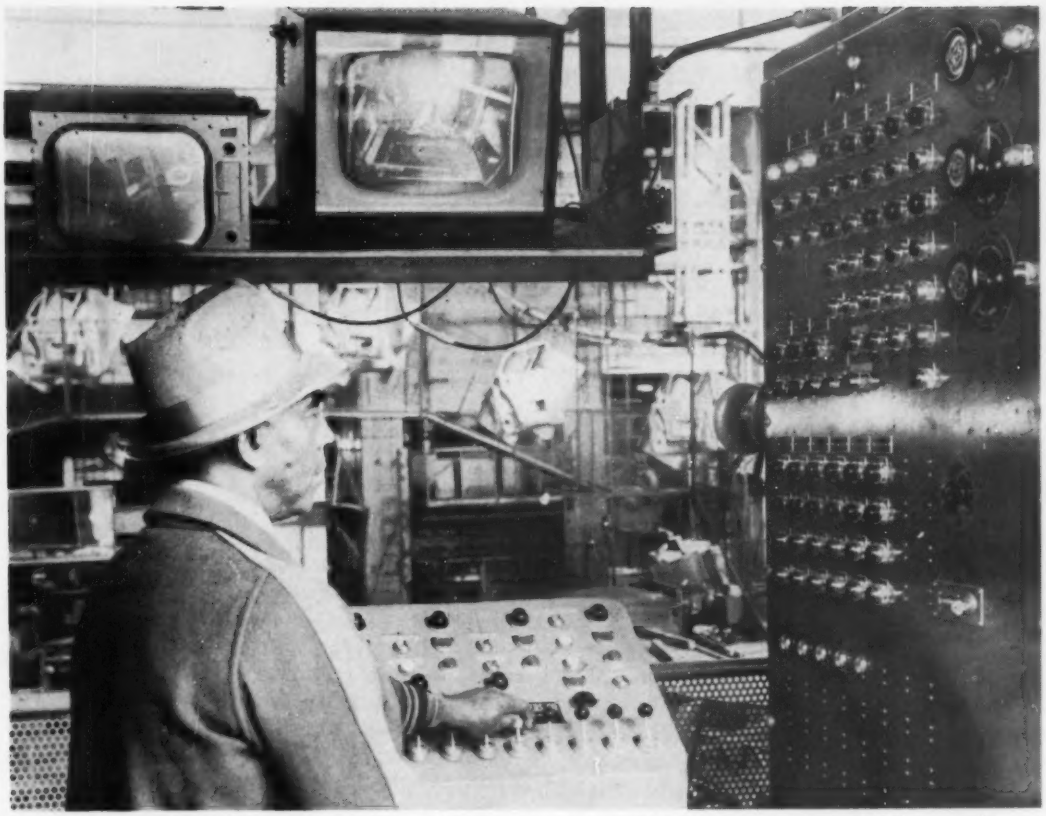
The new system drops nearly all scrap through holes in the pressroom floor, adjoining presses. Chutes carry the scrap to feeder conveyors running crosswise—one for each row of presses—on the floor below. These discharge into a main longitudinal conveyor which is 458 ft long. From the discharge end of this conveyor, scrap is transferred to a speed conveyor and thence to a baler. Bales, made up in 700 lb sizes, are discharged onto an elevating conveyor, from which they are passed down a chute into railway gondolas on a siding. The gondolas return the baled scrap to the steel mills.

Naturally there were many problems in setting up a smooth-working scrap system. Press production rates vary, for instance, and individual pieces of scrap range widely in length and width and generally are not flat. To prevent jams, each conveyor carrying scrap toward the baler has a variable-speed drive and can be reversed should jams occur.

Normally, centralized control is used for the entire system. This is provided from a single station located near the baler but at a much higher level. From this vantage point, the operator keeps an eye on some parts of the system directly. Other critical sections are viewed with two mirrors and two television screens. One TV screen shows the flow of scrap from the speed conveyor into a tipple, where scrap is weighed into 700 lb batches before baling. The other shows scrap flowing from the tipple into the bailer hoppers and thence into the baler itself.

From his panel, the operator can start and stop all conveyors and can adjust the main and speed conveyors as needed to feed scrap to the baler at the desired speeds.

Panel lights provide an extra measure of protection. Individual lights show that corresponding conveyors are in operation, that their protective shear pins have been sheared, or that the conveyor has been stopped by local control for maintenance or other reasons. Other lights show when each baler ram completes its cycle. If a ram sticks, the light tells



OPERATOR CONTROLS entire system, including conveyors, baler and gondola car-puller, from this station. Television, mirrors, signal lights supplement direct vision in overseeing system.

which one it is. A switch then turns the system over to manual operation from the baler station to permit working the ram loose.

Part of the control platform projects outside the building and above the waiting gondolas. From this platform, the operator can see and operate the bale conveyor, the bale chute and the car puller, to shift gondolas for proper loading distribution. Gondolas normally carry about 150 of the 700-lb bales.

Scrap volume fluctuates

Production on each press line naturally varies, ranging from zero (when die changes have to be made, for instance) to maximum. Scrap volume varies accordingly. Each feed conveyor serving a particular press line has capacity enough to handle the maximum foreseeable scrap from that line. But if the conveyor stops, it may become necessary to shut down the press line as well.

Ability to control conveyor speed is therefore important. Feed conveyors must be set not only to suit the rate of scrap production, but to avoid discharging scrap at a rate too fast for the main conveyor to handle.

A slow speed is used in general on the main, 54-in. conveyor. This gives a heavy but even flow of scrap to the 60-in. high-speed conveyor. Both conveyors are regulated in speed from the control platform, by rheostats.

Should the automatic baler stop operating, scrap drops from the speed conveyor onto a 48-in. conveyor which, in turn, drops it onto a third conveyor running up a 20° grade. The loose scrap then discharges through a chute to a gondola on the siding. Normally, the baler is not bypassed unless inoperative, since loose scrap is bulkier, costs more to handle and brings less in price. Scrap will ordinarily discharge from the high-speed conveyor into a three-position tipple.

From the first or loading position, the scrap-laden tipple tilts to about 20° from the horizontal to dump the scrap into the right-hand one of two baler hoppers. The third position, for dumping into the left-hand hopper, is not now in use.

The hopper weighs out 700 lb of scrap and discharges it into the baler, which runs through an automatic cycle requiring about 30 seconds. When the baler opens, the bale drops down a chute to the bale conveyor. This carries it up a 41° incline, drops it down a hoist-operated chute to the gondola below. A chain-type car-puller moves the gondola under platform control.

Tolerances to 0.002 in.—

Eagle-Eyed Inspection Tool Spots Faults Fast

◆ Depending on what you make, production tolerances in tenths or hundredths may or may not be satisfactory today . . . But how about tomorrow? Will today's "good enough" do for tomorrow's needs? . . . Consider what happened at General Dry Batteries, Inc.

◆ While flashlight batteries were its principal production, holding tight tolerances was no problem . . . Then along came tiny mercury batteries . . . Here's how contour projection helped General meet the market need for high production of close-spec parts.

◆ MANUFACTURING TOLERANCES can tighten up fast when electronics moves into an old established industry.

As a for-instance, take dry cell batteries.

There was no great problem in turning out dry cells until a short decade or so ago. Bulk of the batteries produced were of the type that slipped—rather loosely, but quite satisfactorily —into flashlights. Tolerances? An experienced worker generally passed batteries on the strength of a naked-eye inspection.

Then came the revolution. The transistor and its diminutive but powerful partner, the mercury battery, appeared — and caught on fast. The transistor and the mercury battery—each smaller than a dime in size—were teamed up in newer, more powerful and more compact hearing aids. One currently available hearing aid mounts its entire mechanism in the ear-pieces of a pair of eyeglasses.

Left: **MINIATURE BATTERY (top center) in viewing stage of contour projector gets quick dimensional check. Image appears on translucent screen at a precise selected magnification.**

Checks made with the contour projector at General Dry Battery include:

- **Crimping**
- **Plastic, rubber part dimensions**
- **Punch and die accuracies**
- **Dimensions of extruded battery cases**
- **Accuracy of other battery parts**

Tolerances naturally tightened.

General Dry Batteries Inc., Cleveland, typifies the effects of the trend. After working to relatively loose tolerances and comparatively limited production for several decades, it found itself up against a reversed situation. Production looked to go up by millions of units (and has). Production tolerances dipped down to where they have to be measured in thousandths of an inch (and are). Today, orders for one such cell for hearing aids and communications devices run to 5-million units per year.

General acted early. A topflight industrial engineer was brought in to create the first completely quality-controlled shop in the country making dry cell batteries. Result was a plan to set up a foolproof inspection pattern of checking all tools before they're put on punch presses, then of carefully sampling the accuracy of first the zinc castings and then the finished batteries.

Optical gaging chosen

Optical precision gaging was the only practical way for handling the job. Accordingly, a Kodak Contour Projector was installed. This has become one of the plant's busiest machines.

There are four key inspection steps required. These complete the cycle of precision stamping to tolerances as close as 0.002 in., with materials of rounded or angular finished surfaces. Acceptability of these materials is a matter of measuring shapes rather than lines.

Here's the sequence:

1. Dimensions of all dies and tools are checked, using the contour projector's surface illuminator. When necessary, portions of the tools and dies are cut away for thorough checks of depths and shapes.

2. Through shadow projection, all punches for use in impact extrusion of battery cases are checked to 0.001-in. tolerance. A standard tool room chart is slipped in front of the projector's viewing screen for the work.

3. Test pieces are made whenever new sets of dies and punches are received. Tools must turn out sample pieces which will check out on the contour projector to be acceptable.

4. Frequent random samples are taken from all production runs of battery cases, as a check against production performance and tool wear.

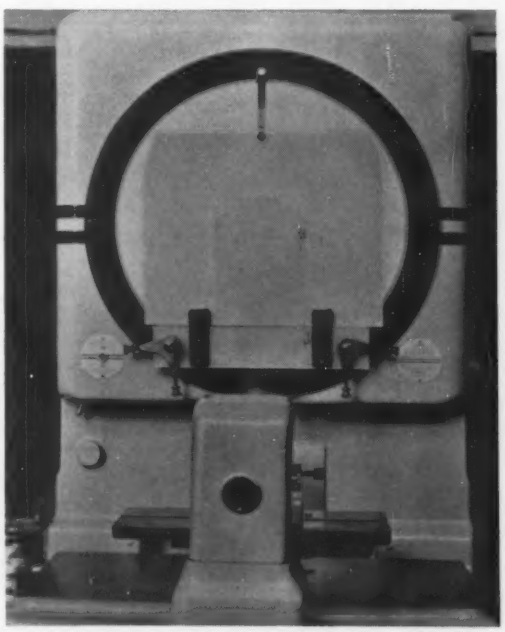
Besides checking basic stampings, the contour projector finds other use, monitoring different production steps. These include the fitting of a rubber or plastic grommet over the open end of the casting and crimping the top in place.

Grommets otherwise uncheckable

The contour projector has proved specially valuable in checking the flexible grommets. Tolerances on these run from 0.002 to 0.005 in., depending on the battery. Mechanical gages won't do for such close measuring—grommets are too flexible and change shape under pressure.

Crimping is another touchy operation. The entire key to long battery life and serviceability lies in getting the top crimped on the battery tight enough to seal internal gases, but not so tightly as to weaken the casing. This job too can be handled on the projector.

For any of these operations, no special setups or machine downtime is required. Special adaptations of the projector are made in seconds, by flipping switches or twisting knobs.



ANGLES, CURVES are most important measurements to be made with dry cell batteries. Device permits fast, accurate check to 0.001-in. accuracy.

Seek top performance—

Pry More Speed From New Tube Mill

◆ Is newly-installed equipment necessarily the "last word" in performance efficiency? . . . Engineers at Dana Corp.'s Marion, Ind. plant delight in trying to squeeze more speed, more versatility, less manual effort out of brand-new machinery.

◆ Take a tube mill installed just three years ago . . . Today it's working up to 36 pct faster on cold rolled strip steel . . . What's more, it's forming heavy-walled tubing that didn't seem practical at first . . . Five men now do the job of eight.

By E. J. EGAN, JR., Machinery Editor

◆ HOW FAR can a company go in pushing a modern tube mill to new performance peaks? Efficiency-minded engineers at Dana Corp.'s Marion, Ind. plant are busy finding out.

Just three years after installing a new welded-seam mill, they've got it (1) running faster than it was designed for, with no loss in tube quality; (2) producing a heavy-walled product it wasn't supposed to be able to make, (3) operating with only five men per shift compared to the eight-man crew that was originally considered the absolute minimum. Moreover, they're aiming for still more speed and production economy and haven't any doubt of their ability to reach these goals.

The mill was intended originally to produce a comfortable volume of thin-walled steel tubing. Dana uses the tubular material in assembling approximately 150,000 automobile drive shaft, universal joint assemblies each month. The tube-fabricating method is one of roll forming strip steel to a cylindrical shape, followed by continuous seam welding.

To increase mill speed, the firm's production engineers have just kept opening the throttle notch by notch. And they've taken every precaution to insure that the equipment would continue to produce close-tolerance, quality tubing at each new speed step.

Raw material for the drive shaft tubing is C-1017 or modified C-1020 cold rolled steel strip. It is supplied in a thickness range of 0.065 to 0.093 in. Hardness of the material as supplied by mill vendors ranges from 87 to 92 on the Rockwell "B" scale. Tubing sizes formed from this cold-rolled strip run from 1¾ in. to 4 in. OD. All of these sizes were originally run through the mill at a uniform speed of 55 fpm.

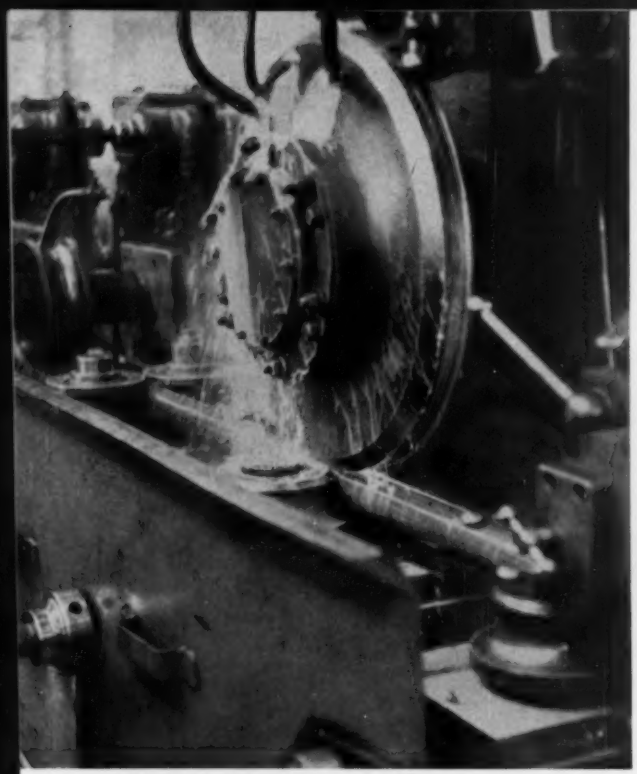
At present, tubing in the 1¾ to 3-in. OD range is produced at a speed of 75 fpm, an increase of about 36 pct. The larger 3½ and 4-in. tubes are now formed at 65 fpm, about 18 pct faster than the original setup.

Set goal for higher speed

Exploratory test runs at 85 fpm are being made over the full size range of this thin-walled tubing. These seek to determine what modifications in drive and control mechanisms might be needed to permit full-time operation at this rate. Plant officials have no doubt that this goal will be reached in the near future.

The firm's engineers point out that the speed increases achieved thus far are really a compromise. Thin-walled tubing could be produced at, say, 110 fpm, but quality would suffer. Another limiting factor was the desire to try producing heavy-walled tubing on what was ostensibly a "thin-wall" mill.

There was plenty of incentive behind this wish, for the firm is also a major supplier of automotive axles. These require tubing with 0.184-in. wall thickness, considerably heavier



STRIP edges are trimmed carefully just prior to this resistance seam-welding operation.

LOOP-storage unit rises high above the tube mill, houses a 500-ft reserve strip supply.

than the drive shaft material. However, the hardness of the hot rolled C-1020 strip ranges from 60 to 75 R_B, somewhat less than the cold-rolled variety.

First cautious attempts at rolling the thicker hot-rolled strip into axle tubing were made at a modest 35-fpm speed. A combination of success and experience led gradually to the present forming rate of 62 fpm, a 77-pct increase.

Having coaxed the mill to higher speeds, and also to the production of heavy-walled axle tubing, the next consideration for the methods group was the possibility of reducing the number of mill operating personnel. The original setup called for six men per shift to supervise operation of the mill itself. Another two were required to coordinate a hydrostatic tube-pressure-testing unit with mill production; a total of eight men in all.

At present, only five men per shift are needed for all mill operations, including the pressure test. This manpower reduction was accomplished by a careful study of man-motions and the ease or difficulty of performing necessary duties from various operator positions along the production line. Integration of automatic tube-handling equipment into the pressure-testing setup meant that the two men originally stationed there could be eliminated.

All five mill operators handle several jobs each. Station for the No. 1 man is at the strip-entry end. He uses a hand-operated crane to load a strip coil into a coil box, guides the end of the strip as it is roll-fed forward to a cut-off shear. This trims the leading edge of the strip so that it can be butt welded with mild steel wire to the trailing edge of the preceding coil. Gas shield for this weld splice is 98 pct argon, 2 pct oxygen.

An overhead loop-storage unit is built into the mill setup just forward of the butt-welding station. This accommodates about 500 ft of strip material as a production reserve against unexpected delay in loading or butt-welding operations. At normal speeds, the mill can run for more than six minutes simply by drawing on this bank of strip stock. This is usually more than enough time to get a new coil into the loading box, and butt weld it to the previous strip.

Carbide tools trim edges

As the strip emerges from the loop-storage section, its edges contact carbide trimming tools. These are positioned on either side of the strip conveyor, just forward of the forming rolls. A minimum of 0.030 in. of steel is removed from each edge of the strip to provide clean, parallel surfaces for the tube-seam welding operation.

The second operator on the mill works from a pulpit adjacent to the in-line resistance seam welding unit. This man controls mill speed, pressure and amperage of the welding roller,

Firm's Engineers Outline Three-Way Approach to Peak Equipment Performance

1. Speed . . .

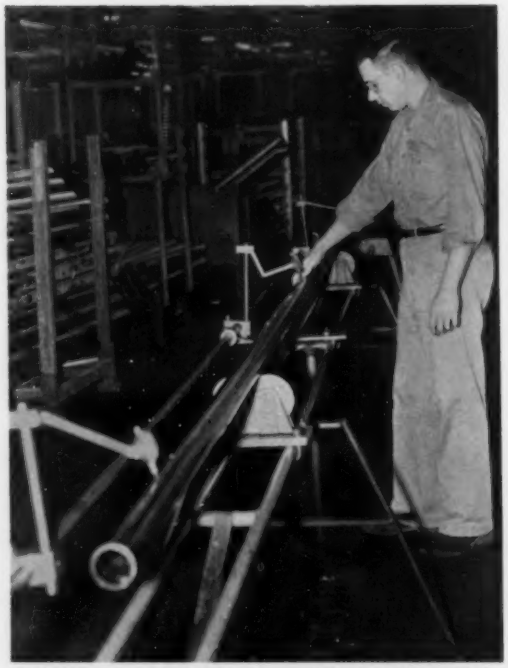
It's natural to exercise some caution when "breaking-in" a new piece of equipment. But —don't let trial rates become standard.

2. Versatility . . .

Even a machinery builder can't always visualize all the jobs his equipment can be made to perform. You might be able to show him a trick or two.

3. Manual Effort . . .

If a machine operator's positions, motions, handling jobs are awkward or difficult, try to make them easier, more natural. You'll get better production and more of it.



ROVING inspector checks random lengths of tubing for straightness at both ends and middle.

and keeps an eye on the edge trimming operation.

He also watches the newly-welded tubing as it passes under a carbide scarfing tool. This removes excess weld bead before the tube enters a series of straightening rolls. Last roll in this tandem setup is a "turk's head" unit for final, accurate sizing and rounding.

Operator No. 3, positioned just past the final sizing roll, controls and adjusts the roll-sizing operation from another pulpit. He also checks the passing tubing periodically for correct outside diameter, using a snap gage. In addition, he applies a daub of paint to clearly mark-off the lengths of tubing that are just ahead of and just behind the butt-welded section where two coils are joined. These lengths are purposely not seam welded.

Use rotary knives for cutoff

Operator No. 3 also supervises the operation of the automatic traveling cut-off unit which follows the roll-sizing operation. This set of opposed rotary knives moves with the tubing. It is actuated by a limit-stop control that can be adjusted to cut tube lengths ranging from 8 to 20 ft.

The No. 4 man on the mill is stationed just beyond the cut-off table. Not an actual mill operator, he must be on hand to cut out short test lengths of tubing representing the beginning, middle and end sections of each coil of strip steel. He applies wedge and bend tests to these pieces and records the data.

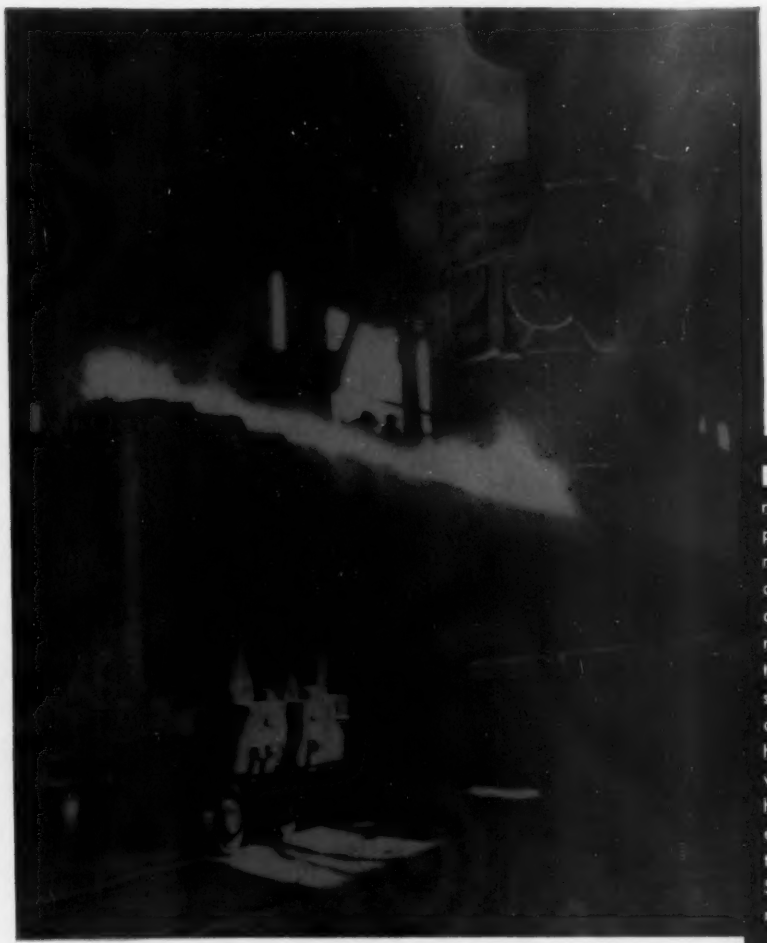
Meanwhile, production lengths of cut tubing are automatically conveyed to final straightening rolls. Operator No. 5 adjusts these to conform with straightness reports relayed to him from final inspection.

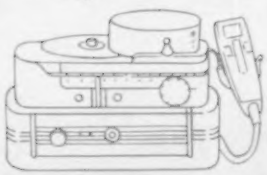
The straightened tubes then move to a loading rack which drops them, one at a time, into position for a hydrostatic pressure test. (This test is not required for the heavy-walled axle tubing.) Both tube ends are sealed and, depending on tube diameter and wall thickness, a specified water pressure is applied internally.

Rejects from this test are noted by Operator No. 5, who pushes a button to by-pass them to a salvage-check rack. Acceptable tubes from the pressure test automatically pass on for a dip into a rust-proofing solution, followed by an oven-drying operation.

From the drying oven, tubes move onto a conveyor whose rolls are rubber coated. This conveyor has two targets, positioned so that tubes must contact one or the other. Tubes proceed to the far end of the line to touch and be counted by the target at that location. They then drop off the line into a sling of two heavy, end-supporting belts that are under controlled tension. As the weight of the counted-tube load increases, the belts gradually lower the tubes into a steel-frame unloading rack which can be picked up by an overhead crane.

TALK, LOOK AND LISTEN WITH Newport Steel





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New Technical Literature:

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Cylinders

Condensed 6-page reference bulletin with data on a new line of cylinders is now available. This bulletin gives mounting dimensions and specifications on eight standard styles offered in 1 in. to 3 in. bores; and seven styles in 4 in. to 8 in. bores. The cylinders are recommended for air to 200 psi and oil pressure to 750 psi. *Tomkins-Johnson Co.*

For free copy circle No. 1 on postcard, p. 117

Cooling, condensing units

Sections of various types that are used to build cooling and condensing systems for process fluids are described and illustrated in the recently issued Catalog HT-23. This 24-page catalog was prepared as a comprehensive reference guide to one manufacturer's heat transfer apparatus. Among subjects covered are the design features of the sections, their physical characteristics, and a variety of types of installation. Thermal design of a cooler or condenser has an engineering presentation, as have the calculations for an evaporative cooler. *National U. S. Radiator Corp.*

For free copy circle No. 2 on postcard, p. 117

Fire hose

A 4-page illustrated data sheet on a line of industrial fire hose has been published. The sheet reviews factors in the selection of hose for safety and long life. In addition it offers operating data and specifications on 11 types of this manufacturer's fire hose for industrial use. Also described is the company's chemical treatment for hose which protects against mildew, rotting, moisture absorption and freezing; and an end protection said to add 100 pct more strength to hose ends. *B. F. Goodrich Co.*

For free copy circle No. 3 on postcard, p. 117

FOR YOUR COPY

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, page 117.

Gun drill setup

A new engineering data sheet described as simplifying the basic gun drill setup for a firm's rotating drill is now being offered. The line drawing with exact labeling of each part of the set-up has been designed to assist in ensuring an accurate and speedy setup. *Eldorado Tool and Mfg. Corp.*

For free copy circle No. 4 on postcard, p. 117

Ultra-violet microscope

Bulletin 370 describes an automatic color translating ultra-violet microscope available for accurate structure determination and indication of absorption spectrum. The 4-page illustrated bulletin describes applications and operating principles. It contains a bibliography of experimental results obtained with the microscope. *Boston Electronics Div., Norden-Ketay Corp.*

For free copy circle No. 5 on postcard, p. 117

Dust collectors

A complete line of cabinet cloth filter and cyclone separator type dust collectors is pictured and described in a new 16-page catalog. Included is a list of operating and construction features, details of each model, accessories, optional equipment, selection information, specifications and descriptions of such allied products as exhausters and blowers made by the firm. Photographs show actual installation views. *Torit Mfg. Co.*

For free copy circle No. 6 on postcard, p. 117

Power tools

New 8-page booklet illustrates and explains the advantages of teaming standard industrial power tools with special-purpose machine tools. The booklet lists ten reasons why the strategic use of power tools in a supplementary capacity can increase production, improve product quality and reduce costs. Photo-illustrated case histories show results of use of power tools in metal-working plants and foundries. *Delta Power Tool Div., Rockwell Manufacturing Co.*

For free copy circle No. 7 on postcard, p. 117

Indicator lights

A new, compact series of indicator lights for heavy-duty industrial applications, are summarized in a 4-page brochure. Salient features, such as oil-tightness, dust-tightness, omnidirectional light spread, ruggedness, and adaptability of these units are covered. In addition, photographs, lamp drawings, dimensional diagrams and full descriptions are given for indicator lights using incandescent and neon glow lamps. *Dialight Corp.*

For free copy circle No. 8 on postcard, p. 117

Moisture determination

Prepared by a control tool manufacturer, a new catalog illustrates and describes items needed for accurately analyzing the amount of moisture in any solid, granular, liquid or semi - liquid material. Listed are moisture tellers, speed ovens, speed desiccators and accessory items such as balances, weights, sample pans and drying dishes. *Harry W. Dietert Co.*

For free copy circle No. 9 on postcard, p. 117

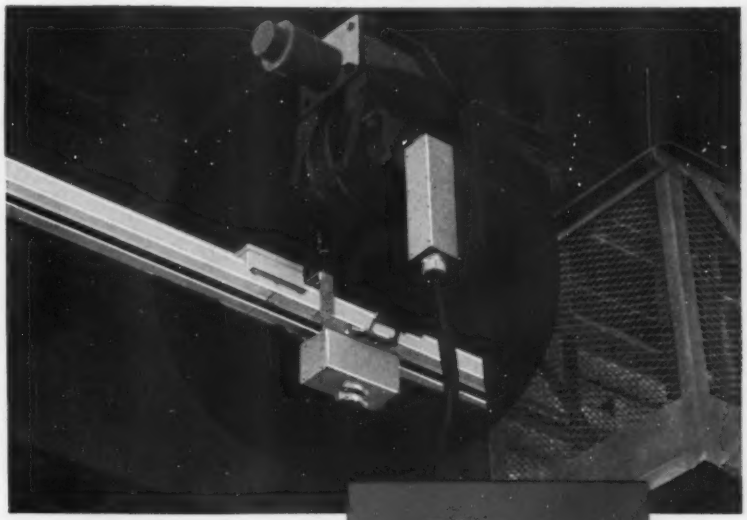
Ball bearings

Complete information on a new line of semi-precision ball bearings is now ready for immediate distribution. Included are data covering types of ball bearings (standard and specials), sizes, installation and suggested applications. Details on the company's nylon bearings, developed for extreme low rpm use, are also included. *Freeway Washer & Stamping Co.*

For free copy circle No. 10 on postcard, p. 117

safe

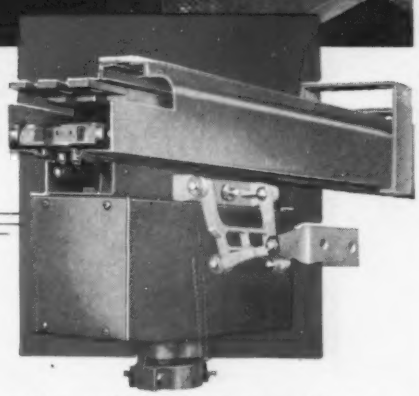
electrification for HEAVY DUTY CRANES and HOISTS



FEEDRAIL®

Mooring

POWER SYSTEMS



Why let Crane and Hoist wiring endanger workers or be a potential hazard to your plant? Heavy Duty Feedrail trolley busways give you safe electrification because:

1. **They're a built-for-the-purpose system, designed and constructed expressly for high amperages.**
2. **All current carrying conductors and trolley contacts are protected every inch of the way.**

In addition to maximum safety, Heavy Duty Feedrail fits your requirements. Its standardized components—accurately, ruggedly constructed—make for fast, easy installation. Its low maintenance, long life and continuous dependable service are economy factors in plant operation. 53-2 Rev.

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☐ Test Lines ☐ Other Applications (please specify)

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When a breakdown stops production, downtime becomes an *expensive* liability. Any delay in getting replacement parts or technical help adds to this expense.

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The NAMCO nameplate on your machine assures service — in emergency or normal situations — when and where you need it.

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FREE LITERATURE

Stainless wire

New specification bulletin describes the advantages of a special Type 302 stainless wire for springs and similar parts. In addition to outlining corrosion resistance and other features of the wire, the bulletin charts the range of tensile strengths for various sizes, and shows in table form the minimum tensile strengths of representative sizes. A graph shows resistance to relaxation at elevated temperatures. Specifications are given for shapes and size ranges, along with a complete description of properties and characteristics. *Webb Wire Div., Carpenter Steel Co.*

For free copy circle No. 11 on postcard, p. 117

Titrimeter

Bulletin FS-247S describes a new instrument (a coulomatic titrimeter) to speed the analysis of mercaptans in gasoline, traces of halides, and a variety of other substances, including arsenites, antimony, thiosulfate, thallous ion, ferrocyanide, cyanide, cobalt, iron, nickel, vanadium, dichromate, and permanganate. The unit is described as having a series of interchangeable electrodes that make it applicable to a wide variety of analyses. *Fisher Scientific Co.*

For free copy circle No. 12 on postcard, p. 117

Conveyor idler

Ball bearing belt conveyor idler is described and pictured in Folder 2516. Reported as new from base to ball bearings, these idlers are available in two types—greaseable and factory sealed—for seven belt widths ranging from 14 to 36 in. *Link-Belt Co.*

For free copy circle No. 13 on postcard, p. 117

Ultrasonic tester

An 8-page bulletin covering application of an ultrasonic reflectoscope to non-destructive testing of products and equipment has been published. It illustrates many uses of the unit, while explaining in simplified terms the principle of ultrasonic inspection. In addition, the latest types of equipment are illustrated. Bulletin is numbered as 50-105. *Sperry Products, Inc.*

For free copy circle No. 14 on postcard, p. 117

Keystone Aluminum Conductor System Installed at Penna. R.R. Shops

ASSURE 7 WAY SAVING IN WEIGHT...POWER...LABOR

THIS IS AN immense project—the new car repair shop of the Pennsylvania Railroad. The shop is 2760 ft. long; 15 overhead cranes are required with capacities up to 25 tons. To furnish electrical connections for the cranes two 3-rail Keystone Aluminum Conductor Systems, each running the full length of the shop, were specified and installed.

Keystone was judged best qualified to meet the rigid conditions required of this installation. It was selected because it would . . .

SAVE TRANSFORMERS—Three installations needed with steel conductors are eliminated with Keystone Aluminum Conductor System.

SAVE FEEDER RUNS—With this non-magnetic system, all but the center tap is eliminated.

SAVE BOOSTER CABLES—System capacity permits satisfactory operation ¼-mile from feeder without boosters.

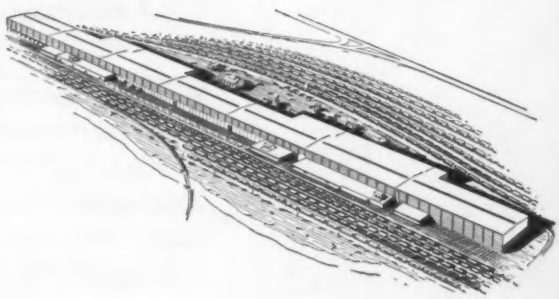
SAVE CAPACITY—Compact design permits close conductor spacings, minimizing impedence drop, reducing conductor size.

SAVE ENGINEERING COSTS—Integrated package design, factory assistance reduce time and effort.

SAVE INSTALLATION COSTS—Lightweight components, factory prefabrication, foolproof design cut erection time and cost.

SAVE OPERATING COSTS—Adequate voltage supply assures maximum crane operating speeds, reduces motor overloads. Protected contact surfaces eliminates shutdowns on exposed systems.

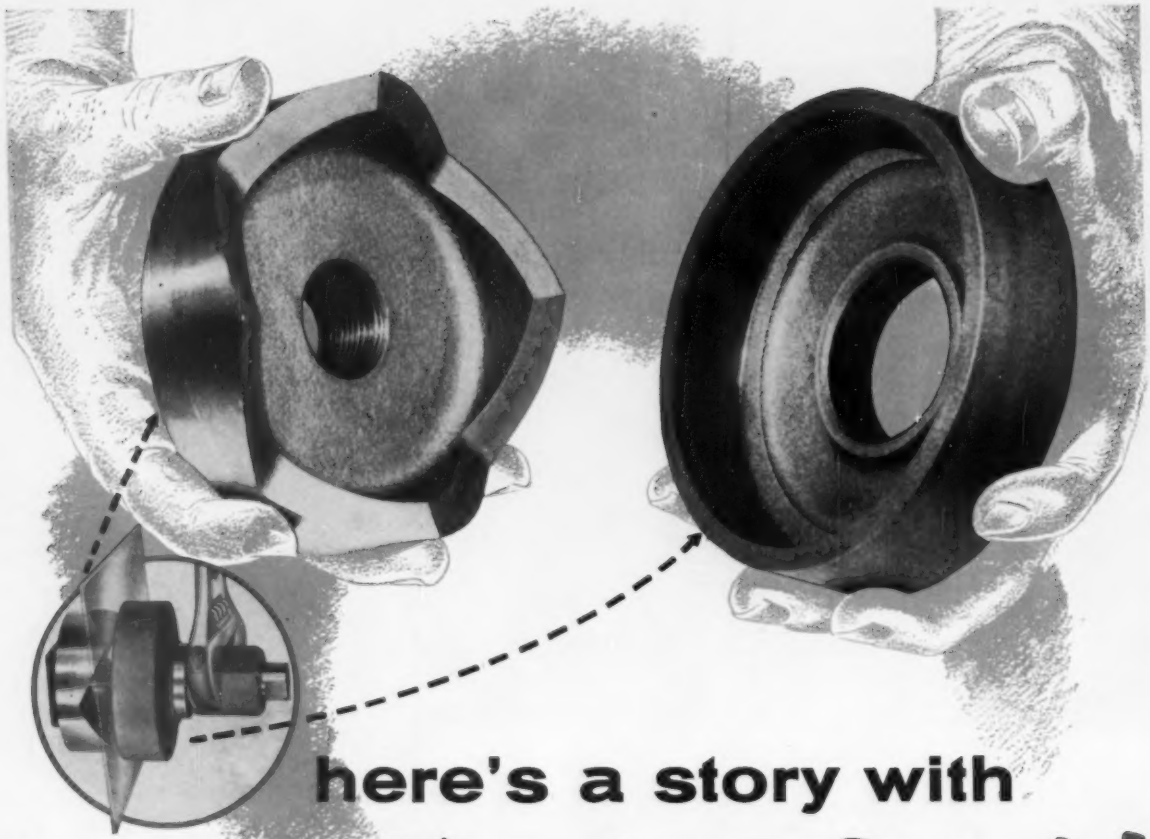
Keystone Aluminum Systems are now operating countrywide on AC and DC runways from 50 to 2760 ft. long, and on ore bridges and unloaders. Standard components range from 500 to 1000, 2000, 3000 and 6000 amp. capacity. Write today for case histories—*"Solving Conductor Problems."*



NEW SAMUEL REA SHOP at Hollidaysburg, Pa. where 50 steel hopper and gondola cars will be rebuilt each day. Large photo above shows 5 of the 15 overhead cranes, 2760-ft. runway; insert shows close-up of Keystone three-rail collector assembly. The Harry F. Ortlip Company of Philadelphia, specialists in railroad engineering and one of the largest electrical construction firms in the East, made the installation for Pennsylvania Railroad.

ELECTRIC SERVICE MANUFACTURING CO., PHILADELPHIA 32, PA.

KEYSTONE



This is one of many knockout punches and cutters manufactured by Greenlee Tool Co., Rockford, Ill.

here's a story with a Knockout Punch!

A Tool Manufacturer Made Drastic Reduction in Production Costs by Using a Copperweld Leaded Alloy

Knockout punches involve turning, drilling, milling and grinding. When the Greenlee Tool Co. switched to a leaded alloy their spindle RPM increased 30%, their tool feed from .005″ IPR to .009″ IPR—ID hogging could now be done with only one tool. Tools lasted nearly 10 times as long using leaded alloy. This is another case of cutting production cost by using steel with "built-in productivity."

Freer feeds and speeds and longer tool life can be yours if you switch to Copperweld Leaded Alloys.

For further details, write for free booklet, "Lead Treated Steels"

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COPPERWELD STEEL COMPANY • STEEL DIVISION • WARREN, OHIO
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FREE TECHNICAL LITERATURE

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

This section starts on p. 112

Tungsten story

"Tungsten—the Story of an Indispensable Metal," is a 28-page hard cover book prepared by the Tungsten Institute. It presents in concise and readable style the developing use of this metal, its importance as a strategic material, and its use in electronics, lighting, communications systems and ultrasonic machining. *The Tungsten Institute.*

For free copy circle No. 15 on postcard

Miniaturization study

Twenty-page booklet is concerned with the trend toward miniaturization. Built around the benefits of space and weight saving, it covers the mathematics of miniaturization, designing for miniaturization, data for miniaturization and materials for miniaturization. *Standard Pressed Steel Co.*

For free copy circle No. 16 on postcard

Four-way solenoid

Catalog 6-C describes a new 4-way solenoid valve, produced for the control of air, water and light oil to 150 psi. The solenoid is mentioned as inoperative when its cover is removed, and as having a manual override which is safe against accidental actuation. *Barksdale Valves.*

For free copy circle No. 17 on postcard

Torque wrench

Literature is available describing a new torque wrench designed and engineered for production line and construction use. The unit is reported as offering speed, automatic control, precision (max torque variation ±2 pct), and durability. Specifications are included. *Jo-Line Tools, Inc.*

For free copy circle No. 18 on postcard

Thread rolling machines

A 12-page booklet covers a company line of hand feed threaders. The machines illustrated and discussed in this circular are the reciprocating type using conventional flat dies. Photographic illustrations show the variety of threading and other operations which can be performed. The booklet also gives illustrations and complete tables of specifications covering various sizes of horizontal hand feed, horizontal-side hand feed, horizontal hand feed with deep dies and inclined-side hand feed thread rollers. *Waterbury Farrel Foundry & Machine Co.*

For free copy circle No. 19 on postcard

Diamond, carbide cutter

Company catalog describes and gives specifications for a line of diamond files, powder, wheels, cutoffs, and wheel dressers. Also described are resinoid bond diamond wheels, resinoid bond hones, drill head assemblies and polishing brushes and grinding accessories. A separate publication available is the same manufacturer's manual for the proper use and application of industrial diamond tools and related products. *Starlite Industries, Inc.*

For free copy circle No. 20 on postcard

Oxygen analyzer

New 16-page color catalog (55-829-56), explains principle, construction, operation and features of both a paramagnetic type oxygen analyzer and an electronic recorder. A chart of major applications lists functions, examples of services, and how and why this analyzer is used. Special models are also described. *The Hays Corp.*

For free copy circle No. 21 on postcard

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31	32	33	34	35	36	37	38	39	40
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Industrial chemicals

Technical Bulletins on heat treating, plating, finishing and allied compounds are now available bound in an attractive, permanent cover. Each booklet contains data sheets and information on heat treating salts, black oxide compounds, metal cleaning compounds, rust resisting oils, quenching oils, and other products that form one firm's line of industrial chemicals and equipment. *Swift Industrial Chemical Co.*

For free copy circle No. 22 on postcard

Axial fans

Two-color illustrated catalog (Bulletin B-1013) describes a series of axial fans for ventilation, process air supply and process air recirculation applications. The catalog describes and illustrates tubeaxial and vaneaxial flow principles and explains the various arrangements possible with the manufacturer's axial fans. Design and construction features as well as specific recommended applications are discussed. A special guide for the use of architects, engineers and fan buyers when ordering axial fans is also included. *American Blower Corp.*

For free copy circle No. 23 on postcard

Mica bonded insulation

General Catalog M-55 describes a company's line of bonded mica insulation available in fabricated parts, plates, sheets, segments, tapes, tubes and V rings. Fabricating and machining are covered. *Continental-Diamond Fibre Div., Budd Co., Inc.*

For free copy circle No. 24 on postcard

Vibration meter

Bulletin CEC 1566 describes an all-transistor vibration meter with a self-contained power source, which is described as capable of being carried and used anywhere to measure the amplitude of vibrations in the 10- to 1000-cps frequency range. The unit is mentioned as adding new flexibility to the techniques of tracking down and measuring mechanical vibration. *Consolidated Electrodynamics Corp.*

For free copy circle No. 25 on postcard

Multi-purpose cutter

Four-page folder describes a universal power cutter for plate and sheet metal working. Illustrated are its actions in beading, folding, slot cutting, straight cutting, circle cutting and louver cutting. Specifications and capacities are also given. *Nord Corp.*

For free copy circle No. 26 on postcard

Cutting tools

Catalog 601 is described as providing easy reference to the cutting tools in one company's line. Appearing for the first time in this catalog, the manufacturer states, are 11 new end mills ground from the solid, as well as a new carbide countersink. The catalog also includes sections on H. S. S. and carbide rotary files and cutters, countersinks, carbide end mills and special tools. In addition there is a listing of all styles, shapes and sizes in easy-to-read tables, plus dimensions, angles and operating data. *M. A. Ford Mfg. Co., Inc.*

For free copy circle No. 27 on postcard

Hexagon and locknuts

A new self contained edition of a 24-page engineering data section has been released by a manufacturer of standard and special 12 pointer and hexagon nuts and locknuts. Topics concerning the technique in the manufacture and the proper installation of their products are covered in this brochure. A guide chart for calculating wrench torques, as well as all of the variables that must be considered in relation to bolt tightness and wrench torques, is included. *National Machine Products Co.*

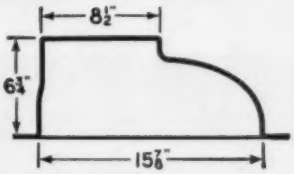
For free copy circle No. 28 on postcard

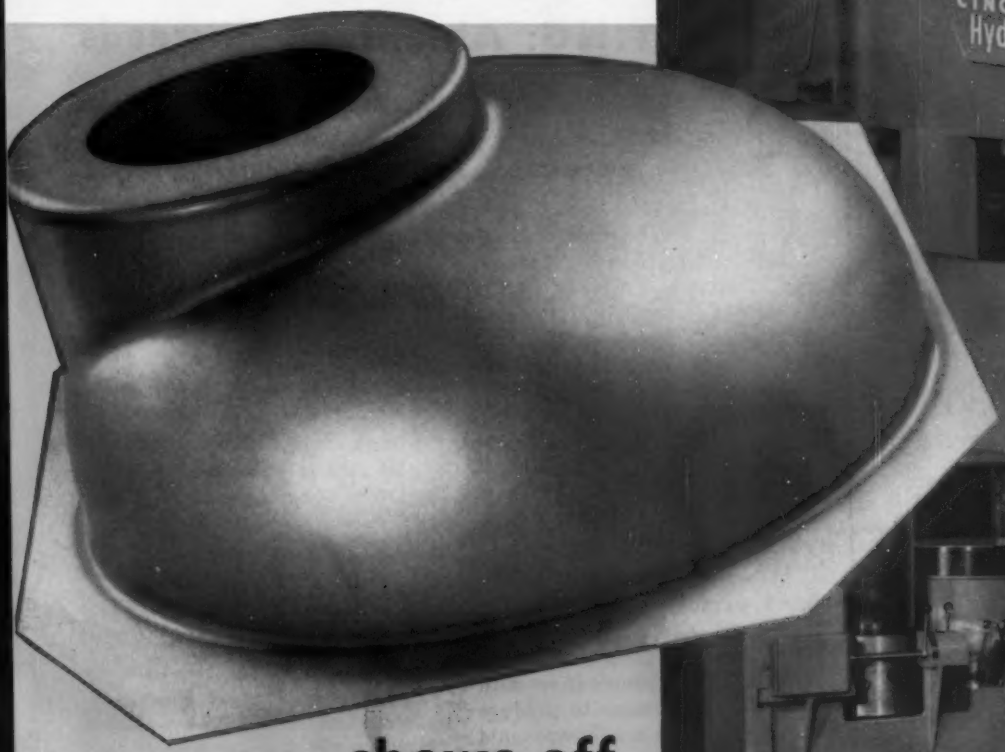
Utility drills

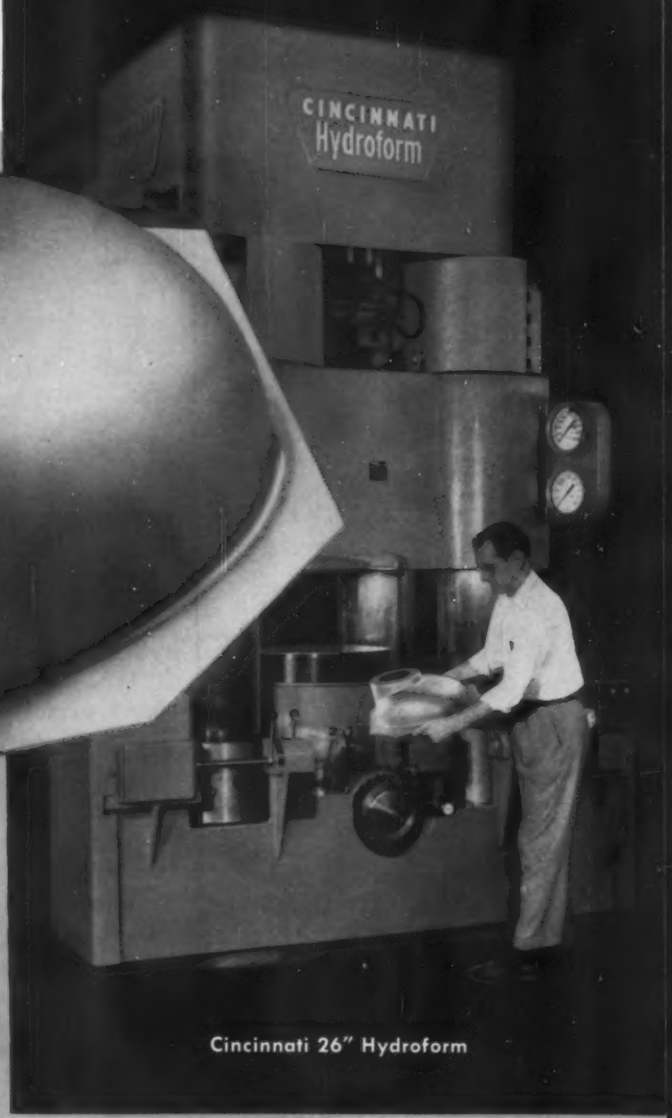
A folder is available on a line of high speed utility drills especially designed and heat treated for applications requiring a sturdier, shorter drill. According to the literature, these drills with the shorter flute and overall length, have greater rigidity and will withstand much of the stress and strain which would otherwise cause breakage. *Chicago-Latrobe.*

For free copy circle No. 29 on postcard

Material: .040"
Type 302 stainless steel







Cincinnati 26" Hydroform

shows off the advantages of

Hydroforming

complex stainless steel shape . . . drawn in one operation . . . using low cost, two piece tooling . . . without impairing high finish of the material.

The part, a top section of a cream separator, was drawn to desired dimensions without thin-out in *one* Hydroform operation. A 26" dia. blank having a 3½" dia. hole, was used. Tools—a male punch and a draw ring—were produced at a fraction of the cost of conventional draw tooling. As the part is a component of a food products container, finish was highly important. The part was Hydroformed without scratching or marring the polished stainless steel surfaces.

This one example is typical of the forming capabilities—the economical tooling—of Hydroforming. Can your company make use of these advantages? Call in a Cincinnati Milling field engineer. Let him assist you in evaluating Hydroforming for your manufacturing program. For a description of Hydroforming and specifications of the 8", 12", 19", 23", 26" and 32" machine sizes, write for your copy of new Bulletin M-1908.

CINCINNATI **Hydroform**

PROCESS MACHINERY DIVISION
THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO, U. S. A.

Large or small INDUSTRIAL CUT GEARS

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- CUSTOM CUT FROM YOUR BLANKS
- HEAT-TREATED, CASE OR FLAME-HARDENED

SIMONDS GEAR produces a complete line of industrial cut gears in a full range of sizes from cast or forged steel, gray iron, bronze, Meehanite, rawhide or bakelite. Also heat-treated, case or flame-hardened carbon or alloy steel. Or, you may have your own gear blanks custom cut to your order. Same quality . . . same prompt service. Send us your requirements for quotation.

ALSO stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.

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Quality Gears for over 60 years

DIECASTING: Aluminum Succeeds

Seeking to combine light weight and performance in portable saw, one manufacturer relies on seven aluminum die cast parts . . . Components described as thin walled and intricately shaped.

By using seven aluminum die castings, Porter-Cable Machine Co., Syracuse, reportedly keeps the weight down to 13½ lb on their Model 108 portable saw.

These die castings, reports American Die Casting Institute, form the saw's main housings, blade guard, handle, and angle adjusting mechanism. But, despite its light weight, the 108 is capable of cross-cutting a 1 in. x 10-in. plank in ½ second.

The unit was specifically designed to combine light weight with outstanding performance. The company's design engineers worked in close cooperation with a job shop die caster to produce the necessary die cast components at lowest possible cost.

Components Are Thin-Walled

The result is a one-piece motor housing that mates with the one-piece upper blade guard and gear housing; a one-piece telescoping lower blade guard designed to prevent catching as the saw proceeds through the wood; a two-piece handle that permits easy switch assembly and provides a comfortable hand-grip; and, a two-piece angle adjusting device that permits sawing as much as 45° off the perpendicular. All of these components are thin walled and intricately shaped.

Aluminum die castings were specified for these components because of their high strength characteristics, smooth surface finish, ability to hold close tolerances (a basic requirement in the assembly of a power tool), and ability to be intricately shaped with undercuts, thin walls, complex curves and angles. Aluminum 380 alloy (ASTM Spec. B85-46T, Alloy SC7) is specified for the castings.

WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 117. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

Lightweight saw capable of cutting 1 x 10-in. plank in ½ sec.

Testing:

Metal windows face force of 150-mile hurricane

A new test chamber for creating the static equivalent of a 150-mile-an-hour hurricane has just been completed by the Truscon Steel Div. of the Republic Steel Corp. It is being used to check up on new designs in metal panels and metal windows for big buildings.

The chamber is 20 ft high and pumps its own water under pressure against prototype windows installed into it for test. The windows are then released for independent laboratory tests and eventual mass manufacturing. According to Truscon engineers, the new installation makes it possible for the company to check and recheck on design and manufacturing steps without going to the delay involved in shipping the

window back and forth between the plant and an independent research laboratory. In the final evolution of any window design, a prototype goes to the independent laboratory to assure customers an objective finding.

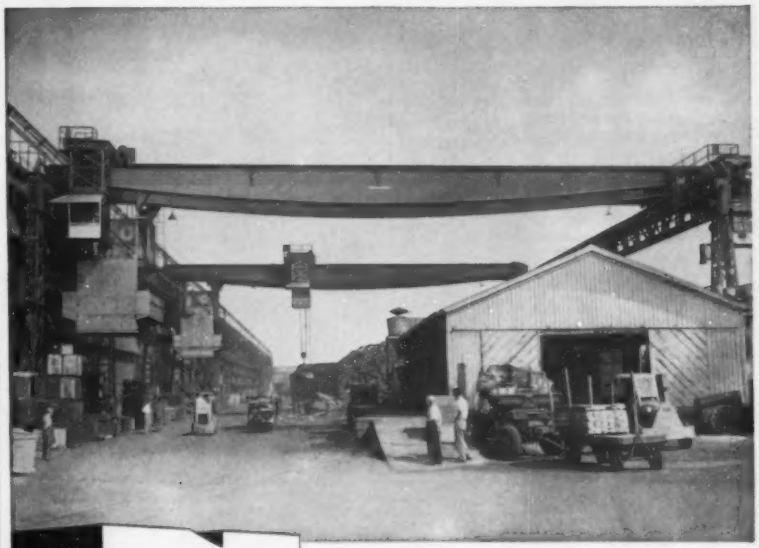
In appearance, the test chamber looks like a giant metal sandwich, the two halves of which can be rolled apart to permit working and inspecting window samples installed on the inner face of the actual test chamber. The area constructed to take the window samples is designed to give tests to windows ranging in size from small residential units to large units built for skyscrapers or large industrial buildings.

High air pressures are used to storm test window frames.

In operation, the chamber develops wind and water pressure within the large rectangular box constituting one-half of the sandwich. Facing inwards, the window under test receives a constant drenching attack of 30 gallons of water per minute. This impinging spray is pressure-fed by a pump and a 5 hp electric motor constructed under the floor of the chamber. The water thus pushed against the window drains off under the floor and is then put back into circulation.

Truscon contemplates that the various sizes of windows to be tested will call for a variety of panels and diaphragms to fill up the space around the window frames.

Look overhead..see "NORTHERN"



NORTHERN CRANES uniquely adapted *for the Foundry Yard!*

These two 10-ton, 100-foot span NORTHERN OVERHEAD ELECTRIC TRAVELING CRANES are installed in the foundry yard of a large automotive manufacturing company. To provide better vision and control of loading and unloading in all crane operations, the operators' cabs are attached to and travel with the crane trolleys.

Transfer loading to other handling equipment by means of batch weighing and loading hoppers was designed, built and installed by the customer company.

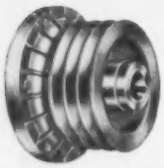
Here is another example in the short-cutting of repetitive, unprofitable materials handling. It demonstrates the substantial benefits of imaginative thinking in solving cost problems in all areas of foundry operation.

Let us send you Bulletins G-700 and SE-108.

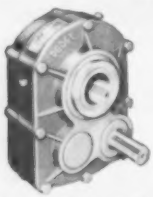
NORTHERN CRANES–HOISTS–TRAVELATORS

NORTHERN ENGINEERING WORKS
210 CHENE ST., DETROIT 7, MICH.

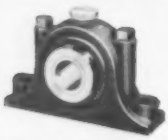
DODGE PRODUCTS
you should know



FLEXIDYNE
DRIVES & COUPLINGS



TORQUE-ARM
SPEED REDUCERS



DODGE-TIMKEN
PILLOW BLOCKS

DODGE BULLETINS YOU SHOULD HAVE

- Flexidyne Dry Fluid Drives and Couplings. Complete story and selection data. Bulletin A-640-A.
- Torque-Arm Speed Reducers. Technical data and selection methods on all 14 sizes—1 to 60 hp. Bulletin A-637.
- Rolling Bearings. Load ratings, dimensions and other data on Dodge-Timken and SC and SCM Ball Bearings. Bulletin A-638.

Write for your copies.

DODGE MANUFACTURING CORPORATION
800 Union Street • Mishawaka, Indiana

DODGE
of Mishawaka, Ind.

Rolling:

Aluminum sheet produced to 'spider web' thinness.

Sheet aluminum thinner than the finest strand of spider web is being produced in a modernized plant of Republic Foil and Metal Mills Co. at Danbury, Conn.

A key feature of the new production facilities was installation of five General Electric Co. "speed variators" to assure constant tension which is vitally important during the rolling operations.

The plant starts with sheet aluminum 0.026 in. thick. This is rolled down to foil of a minimum thickness of 0.00017 in. At this thickness the foil is more than 100 times longer than the original sheet.

Variators Provide Tension

G-E engineers say that at the minimum thickness of 0.00017 in., it would take 12 sheets of the aluminum foil placed on top of each other to equal the average diameter of a human hair. They said the average diameter of an extra-fine strand of spider web is about 0.00020 in.

A Republic spokesman said the speed variators provide constant tension in the foil, plus superior gage control and quality guaranteeing less maintenance and reduced down time. He added that the units replace friction brakes previously used.

Developed by G.E.'s Direct Current Motor and Generator Department, speed variators provide an adjustable voltage, dc drive from an ac power source.

Fabricating:

Bolt-nut unit handles 2000 connecting rods an hour

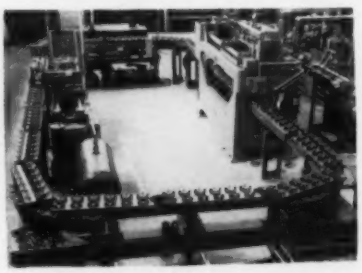
A fully automatic assembly system which bolts bearing caps in place on automobile engine connecting rods has been developed.

Described by the manufacturer, Cleco Air Tools, Div. of Reed Roller Bit Co., as the first of its kind, the machine has a capacity of 2000 connecting rods per hr. The system is fully automatic after the connecting rods enter on fixtures on a continuously moving conveyor, ready for the bolts to be pressed in and nuts set. The bolt-press unit is electro-hydraulically powered while the nut-setting unit is electro-pneumatically powered.

The operations are performed while the connecting rods are traveling on the conveyor at a speed of approximately 22.8 fpm. The connecting rods are placed on six position fixtures, which are on the conveyor, and move to the bolt-press unit positioned above the conveyor.

Automatically Raised

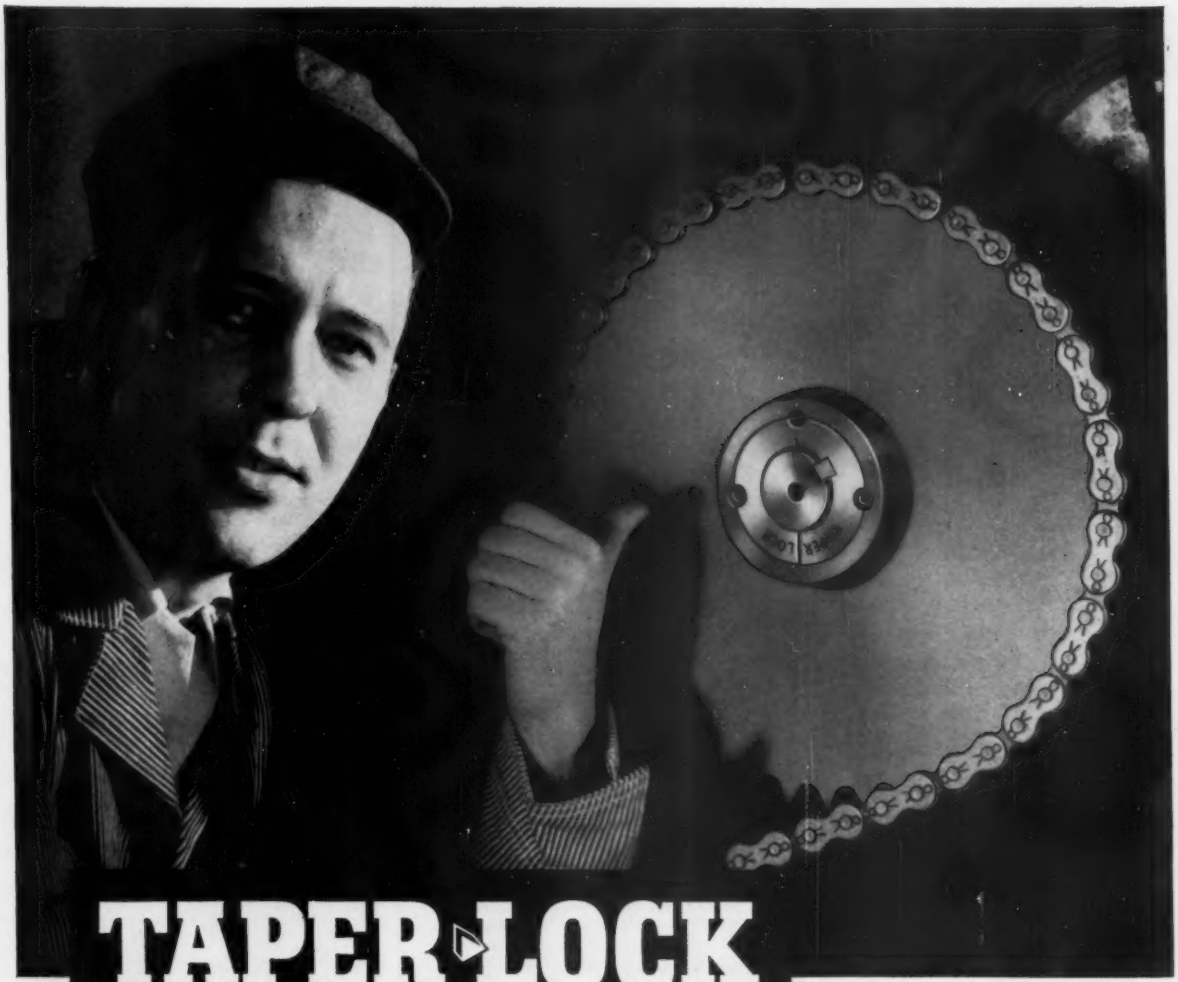
At the proper time the bolt-press drops into position over the fixture and presses two bolts into each of the six connecting rods and caps. Upon completion of this operation, the bolt-press unit is automatically raised and returned to starting position to receive the next fixture. The conveyor then moves the fixture to the nut-setting unit powered by standard air motors.



Overall view shows nutsetter (left), and bolt press (right).

Receive Fixtures Quickly

The nut-setting unit is located to one side of the conveyor, and also moves automatically to engage the nuts and set them to required torque. When this torque has been reached, the nut-setter automatically disengages from the nuts and returns to the starting position ready to receive the next fixture. The bolt press and nut setter are available to receive a fixture every 10.6 seconds.



TAPER-LOCK

A PATENTED PRODUCT OF DODGE

Holds so tight it will twist a cold-rolled shaft!

Yes, the Taper-Lock bushing really grips the shaft—holds with the firmness of a shrunk-on fit. It seats evenly along the entire length of the hub. There's no collar, no protruding part, no flange to prevent uniform compression. Having full contact with both hub and shaft, the Taper-Lock bushing holds so tight it would twist a cold rolled shaft before it let go. *Until you want to demount it!* Then a few turns of a hex wrench will release it quickly and completely, without shock to bearings or machinery. For the full story call your Distributor—or write to

DODGE MANUFACTURING CORPORATION, 800 Union St., Mishawaka, Ind.

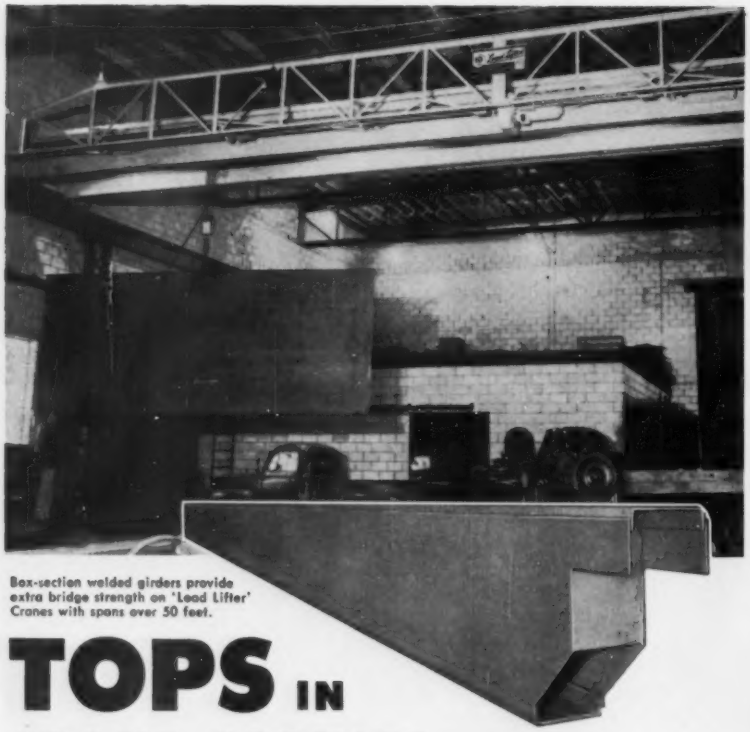
THERE'S ONLY ONE TAPER-LOCK, THE BUSHING THAT MOUNTS FLUSH!

Standardize, economize with Taper-Lock, the bushing that is interchangeable in Dodge sprockets, sheaves, couplings and conveyor pulleys. *More than 2,000,000 in use!*

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on new, cost-saving methods. Look for his name under "Power Transmission Machinery" in your classified telephone directory, or write us.

DODGE

of Mishawaka, Ind.



Box-section welded girders provide extra bridge strength on 'Load Lifter' Cranes with spans over 50 feet.

TOPS IN CRANE SERVICE AND ECONOMY...at low prices

Here you see a typical Series "D" All-Electric 'Load Lifter' Crane. This Series differs importantly from all other brands available for average industrial service. Standardization and mass production methods permit the inclusion of design and construction features not combined in the most expensive cranes. Day-to-day operating and maintenance costs are minimized. Equally important, the initial investment is substantially lower than for other makes for comparable service.

Provided in Series "D" Cranes are plus values like these:

- Every practical use of anti-friction bearings to retard wear, to assure smooth operation.
- All gearing operates in oil to keep maintenance low.
- Double braking system to make accurate spotting easy.
- Positive magnetic control: Floor-operated cranes controlled by push button; cage-controlled cranes by master switches.
- Comparatively low headroom and high hook lift.
- Three-girder bridge on spans under 50 feet and box-section welded girders on longer spans to insure against whipping and skewing.

Series "D" All-Electric 'Load Lifter' Cranes are built in capacities from 1 to 20 tons. All provide complete safety for man, load and crane. Selection is easy. No complicated figuring. Just write for Catalog 221 and make your choice.

MAXWELL MANNING M&M MOORE INC. TRADE MARK

'Load Lifter'® CRANES

MANNING, MAXWELL & MOORE, INC.

MUSKEGON, MICHIGAN

Builders of "SHAW-BOX" and 'LOAD LIFTER' Cranes, 'BUDGIT' and 'LOAD LIFTER' Hoists and other lifting specialties. Makers of 'ASHCROFT' Gauges, 'HANCOCK' Valves, 'CONSOLIDATED' Safety and Relief Valves, 'AMERICAN' and 'AMERICAN-MICROSEN' Industrial Instruments, and Aircraft Products.

Hardfacing:

Conveyor parts alloy hardfaced last 10 times longer

Cast iron cable conveyor buttons which have been hard faced with Colmonoy alloy are lasting 10 times as long as unprotected buttons, according to recent field tests.

Test results were reported by Wall Colmonoy Corp., Detroit.

They were initiated at the request of several paper mills in Canada to determine an effective method for reclaiming worn buttons. It was found, the tests show, that the best results are obtained with uniform bead of Colmonoy No. 6 alloy welded to the circumference of the disc-shaped button ends.

Trough repair and maintenance reduced through hardfacing.

Although increased button life was the primary objective, a secondary advantage has been gained in increased trough life as well. The extremely low coefficient of friction of the wear-proofing alloy reduces the amount of wear and damage to the trough where it contacts the cable button. Trough repair and maintenance costs are thus substantially reduced.

Hardfacing Procedure

The hardfacing method employed in reclaiming cable conveyor buttons is a simple welding process. After being removed from the cable, worn buttons are cleaned to remove all pitch and

other foreign matter. The two cleaned half-sections are wired together in approximate working position and placed in a welding positioner or hung on a supporting rod.

The circumference of the circular ends is then built up to original dimensions by electric arc welding with 3/16 in. diam Colmonoy No. 6 coated electrodes. They are applied by reverse polarity current, using 140 to 160 amp. A single pound of wear-proofing alloy will generally reclaim 7 cable buttons of the 30-pound size, Colmonoy states.

Alloy's Properties Given

The hardfacing material used in the cable button reclamation method is a non-magnetic chromium-boron-nickel alloy which produces a surface hardness of 56 to 61 Rc. It has excellent abrasion, corrosion and galling resistance; excellent red hardness and weldability; and good impact resistance. Specific gravity is 7.80; melting point is 1900°F. It possesses a low coefficient of friction.

Milling:

Throw-away inserts aid roughing and finishing

Insert milling cutters, which do not require sharpening, have been made available to handle rough and finish milling operations on cast iron and steel, according to the Wesson Co. of Detroit.

Employing disposable blades having eight indexible cutting edges, these throw-away insert milling cutters are described as providing a broad range of advances in milling practices. Following are some of their characteristics:

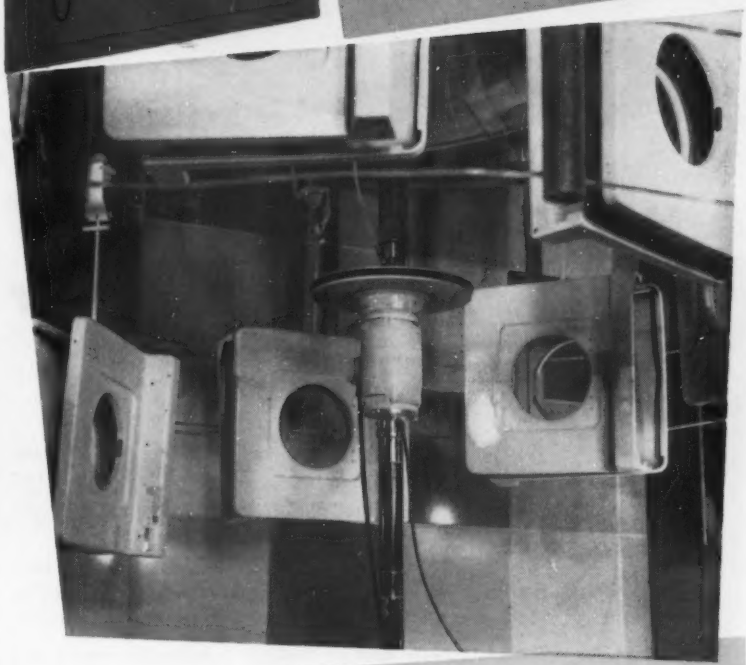
The design of the throw-away insert milling cutter permits high speed milling at high feeds. Negative radial and axial rake combinations provide ample clearance and give eight cutting edges on square blades.

Blade cost is as little as 17 cents per cutting edge.

Elimination of grinding and

NOW for the first time...

PORCELAIN ENAMEL is being applied successfully—Yes, even spectacularly—with RANSBURG NO. 2 ELECTROSTATIC SPRAY PROCESS



General Electric—an extensive user of Ransburg Electro-Spray for painting with synthetic enamels—is the first to use Ransburg No. 2 Process in the application of porcelain enamel.

GE—less than a year in electrostatic production—now is processing almost a million square feet of cover coat each month in the General Electric Home Laundry finishing department at Appliance Park.

DRYER TOPS AND WASHER COVERS ARE BEING COATED ELECTROSTATICALLY WITH THESE SPECTACULAR RESULTS

Quality of appearance and chip resistance are greatly improved with all colors: white, yellow, pink, turquoise, blue and brown.

About 97% of the atomized enamel is deposited on the washer and dryer parts.

Because of improved uniformity in coating thickness, weight of applied enamel was substantially reduced.

Because of lower application weight, the few rejected parts can be re-processed more times before being scrapped. This reduces the ultimate scrap rate by at least 95% of that previously expected.

Efficiency, measured by the amount of good ware, averages above 90%.

Want your products tested?

Ransburg has fully equipped laboratory facilities including reciprocating disks, helical conveyors, stationary disks, and the latest advancements in equipment for applying porcelain enamel with the No. 2 Electrostatic Spray Process. Manufacturers are invited to send sample products to our Indianapolis laboratories for tests and demonstrations to prove for you the advantages and benefits of electrostatic spray application of porcelain enamels.

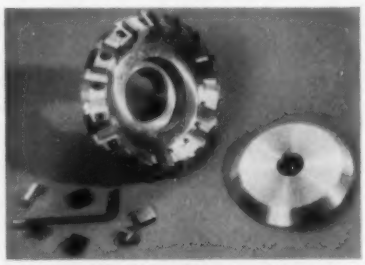
Ransburg ELECTRO-COATING CORP.
Indianapolis 7, Indiana
RANSBURG

need for blade adjustment make rapid blade indexing possible resulting in reduction in setup time.

Since cutters do not have to go back to cutter grind for re-sharpening, excess reserve inventory of cutter bodies is not required. Cutters, in some cases, can be maintained right at the machine. Efficient milling of both cast iron and steel is possible with the same cutter body using different carbide grades.

In addition to their many advantages, these throw-away insert milling cutters can be used with present adapters and machines eliminating special conversion cost.

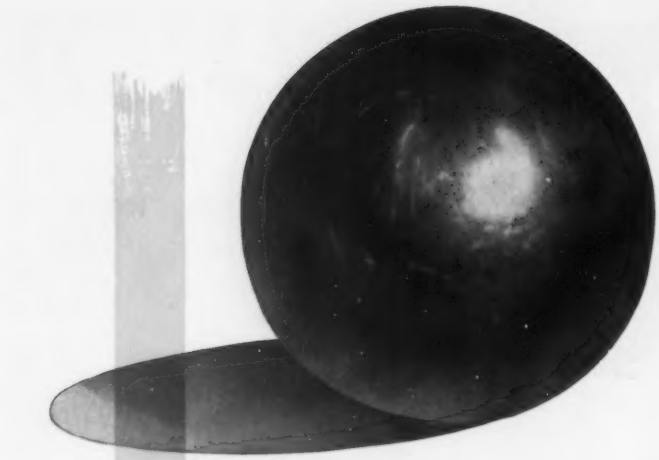
Uniform and positive blade location is achieved by placing a simple ring gage against the cutter face. Blades are then aligned by making contact with the gage and locked in position by taking up on the socket head screw.



Design of inserts permits high speed milling at feed rates.

Performance of the Wesson throw-away insert milling cutters shows, the company states, that they have the ability to take sizeable bites of metal while producing an excellent surface finish. On one job, for example, a 4-in. diam cutter was used to take a roughing cut on SAE 1095 hardened steel tool holder shanks at 1000 rpm and 1048 sfm. Feed rate was 52 in. per minute with a 0.125-in. depth of cut. Production increased and grinding time was materially reduced.

On another job these cutters were used to machine the ends of structural steel I-beams at 1200 rpm and 1250 sfm. Feed rate was 40 in. per minute with a 0.125-in. depth of cut. Despite vibration of the I-beam while milling the web,



A HEAD START
IN STEEL SHOT
QUALITY

Pioneered in 1948, and backed by over 60 years' experience in the manufacture of abrasives, Tru-Steel Shot was the original High-Carbon Fully Heat-Treated Steel Shot of Tool Steel Quality!

Tru-Steel, and only Tru-Steel, has the head start in experience, in manufacturing know-how, in years of solving steel shot blasting problems!

Every heat of Tru-Steel is laboratory tested and controlled to the exacting standards of fine steel making!

Only in Tru-Steel are found the combined characteristics that have been sought for years in metal abrasives — super toughness for resistance to breakage and proper hardness for fast, thorough surface-bright cleaning.

And Tru-Steel is now packaged in 50-lb. double burlap bags — the finest packaging ever devised for metal abrasives — lighter, easier to handle, easier to stack, not slippery like slick, hard-surfaced cardboard cartons.

NOW IN 50 POUND BAG

THERE'S ONLY ONE
TRU-STEEL
Manufactured by
STEEL SHOT PRODUCERS, Inc.
Butler, Pa.
Subsidiary of Pittsburgh Crushed Steel Co.
Pittsburgh 1, Pa.

Sold and recommended by
Pangborn Corporation, Hagerstown, Md.

exceptionally blade life was experienced due to rigid support given to the throw-away insert blades in the milling cutter.

Metals:

Titanium's role to increase, official says

Use of titanium metal in lightweight passenger trains, trailer-truck frames and ship plates has been forecast by a Du Pont Company metallurgist. The metal is now being employed in a surprising array of non-defense applications where resistance to corrosion is vital, Leo J. Barron, of Du Pont's Pigments Department, told the American Association of Mining and Metallurgical Engineers.

In his speech, Mr. Barron described for the first time results of Du Pont's extensive program for development of civilian markets for titanium. In many uses, under extremely corrosive conditions, titanium had far outlasted conventional metals, in one application by a ratio of more than 1800 to one, he said.

Cites Advantages

"Titanium's strength-weight characteristics—a little over half the weight of steel and roughly equal to it in strength—indicate a bright future in the new, light passenger trains, in automobile trim, and in the frames of large trucks, where every pound saved is important economically," Mr. Barron said.

"Of greater present significance in non-defense applications is titanium's corrosion resistance. Because of its ability to form a tenacious protective film on exposure to air or any other oxidizing medium, and because this film is instantly replaced when damaged, titanium is essentially inert in an entire range of solutions which are extremely corrosive even to the better stainless steels."

Economics Developed

Discussing the economics of titanium, Mr. Barron pointed out that in a unit requiring 1/16 in.

When you purchase FASTENERS, your first considerations should be given to quality, delivery and prices.

Chandler, as a leading manufacturer of cold forged cap screws, takes the same considerations. Mass production is only part of their story . . . but absolute control during every phase of production means top quality and uniformity.

Realistic pricing is important . . . and is followed.

If your requirements include automotive, Place self-locking, connecting rod or aircraft engine bolts in high carbon alloy and stainless steels, check with Chandler today. They are prepared to produce special heads, drilled heads and shanks, and ground bolts to tolerances as close as 0.0005-inch.

Write today for literature.

Specialists in Thread-Rolling after Heat Treating.

CHANDLER PRODUCTS CORPORATION

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6473-CH

thick stainless steel, the stainless sheet would cost about 83 cents a lb, while titanium sheet would cost about $15 a lb, or 18 times as much.

Since titanium weighs only 56 pct as much as steel, the cost factor for enough square feet to make the unit drops to 10 times, he added. Then, since raw material cost usually forms a fraction of the cost of the finished assembly (assuming 20 pct in both stainless and titanium), a piece of titanium equipment can cost less than three times as much as one made from conventional materials.

"Obviously every day of increased service life beyond three times that of the previous material is of direct economic benefit."

Another important feature for end-users of titanium, Mr. Barron said, is reduction of plant downtime costs during replacement.

"In one chemical processing operation, titanium replaced Type 309 stainless in a thermowell installation in high-temperature nitric acid service," according to Mr. Barron.

Cleaning:

Shot-blast room for 40 ton weldments operative.

A steel-enclosed shot-blast room, described as one of the largest in Ohio and equipped to handle weldments in excess of 40 ton, has been placed in operation.

The room, 50x22x18 ft, will handle all of the company's weldment work, states the Morgan Eng. Co., Alliance, Ohio. In addition, it will be available for sub-contract work by plants in the area.

Shot-blasting of weldments, castings and fabricated jobs will remove scale and rust resulting from stress-relieving or normal rust accumulation. It also will eliminate weld spatter, paint and grease.

Abrasives such as grit and shot are blown from a nozzle under 85 to 100 pounds air pressure, in much the same way spray paint is applied. The texture of the finish can be varied from fairly rough to fairly smooth, simply by changing the grade of grit or shot. Softer abrasives can be used on aluminum and other non-ferrous metals.

After leaving the nozzle, the grit or shot is screened through heavy gage, perforated steel sheets. It is

This steel-enclosed, shot-blast room is 50 x 22 x 18 ft.

then taken by conveyor back to a hopper where all scale or refuse is eliminated.

Two cars, each with a handling capacity of 25 ton, convey loads in and out of the room.

Materials:

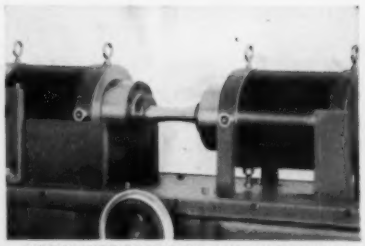
New anionic surface active agent used for cleaning.

A new anionic surface active agent, known as Isomal 265, has been developed which is recommended for use in all kinds of industrial processes as a wetting agent, rewetting agent, penetrant, detergent and emulsifier. It has been specially formulated to reduce processing time, increase processing efficiency and improve finished products.

The new fluid, developed by The Johnson - March Corporation, Philadelphia, is a concentrated sulfonated ester type liquid with exceptional characteristics. It is said to be unusually versatile and efficient.

Many Uses Found

Many uses have been found for this surface active agent in industrial and metalworking plants according to the maker. It can be used to remove grease, oil and moisture from all types of metal surfaces. In fact, it can serve as an efficient cleaning agent for all types of polishing, cleaning and buffing. And it can be used in



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Barnett Foundry & Machine Co., Irvington and Dover, N. J.
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- **"CAMS, CAMSHAFTS AND CRANKSHAFTS" BULLETIN NO. 39**

Write today to Meehanite Metal Corporation, Dept. 1A, 714 North Avenue, New Rochelle, N. Y.

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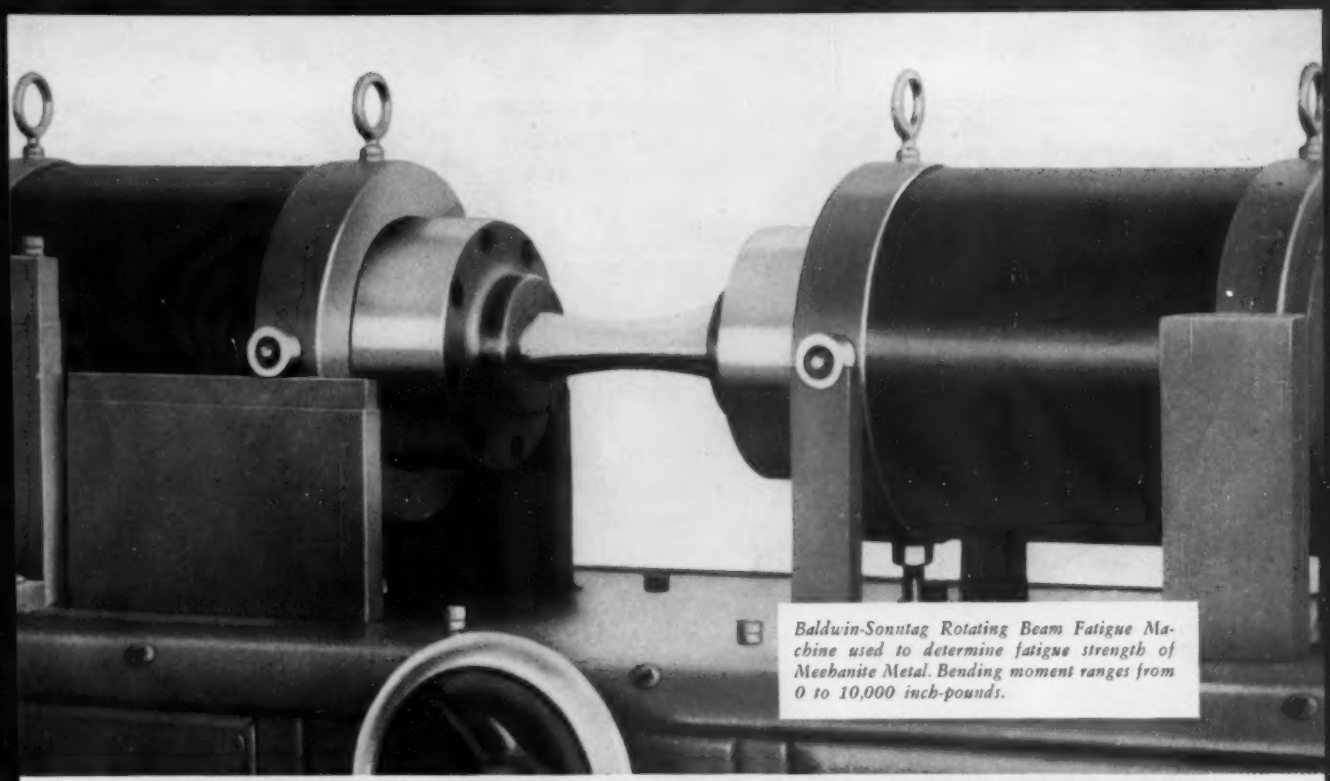
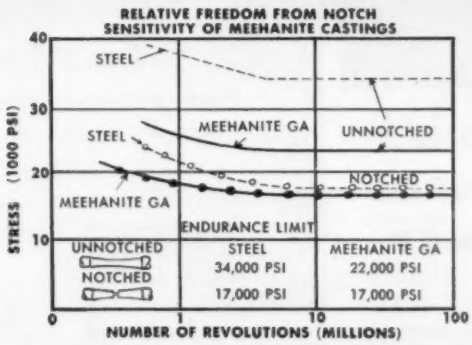


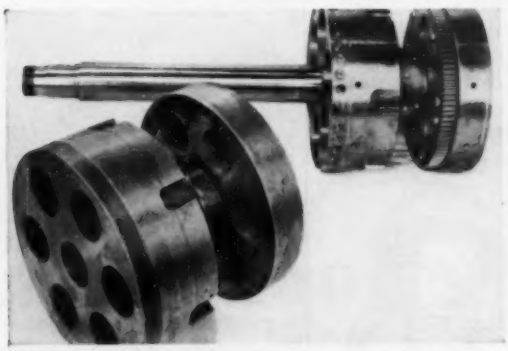
Baldwin-Sonntag Rotating Beam Fatigue Machine used to determine fatigue strength of Meehanite Metal. Bending moment ranges from 0 to 10,000 inch-pounds.

MEEHANITE CASTINGS SHOW HIGH RESISTANCE TO FATIGUE UNDER ROTARY BENDING STRESSES

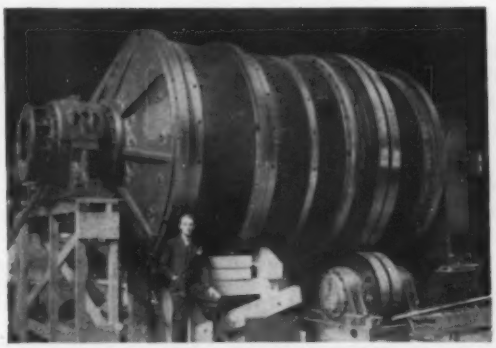


Meehanite Metal, subjected to alternating bending stresses, exhibits high endurance values and the fatigue strength is higher in relation to tensile strength than most other materials. The endurance limit approximates 45% of the tensile strength, thus providing a larger margin of safety against mechanical failure in the presence of stress raisers, such as notches, keyways, poor fillets and poor machine finish.

Consequently, Meehanite Metal has found wide application in the manufacture of crankshafts, centrifuges, ball mill crushers, machine tool spindles and other parts repeatedly stressed by bending loads. *Write today for Bulletin No. 37, "Proof that Meehanite Bridges the Gap," and Bulletin No. 39 "Cams, Camshafts and Crankshafts."*



Meehanite spindles for automatic bar and chucking machines withstand rapid and heavy torque shocks and maintain accuracy of tool alignment during service.



Marcy Mill carries ball load of 50 tons with 70-ton load on each trunnion requiring maximum fatigue life. Meehanite Metal has been proven superior to steel.

MEEHANITE METAL®

MEEHANITE METAL CORPORATION • NEW ROCHELLE • NEW YORK

KEYSTONE XL COLD HEADING WIRE

SAVED . . . $13.26 PER M
Refrigerator foot level screw formerly made in two parts. Now cold headed from Keystone "XL" Wire.
SAVED . . . $46.15 PER M
This severely upset part was formerly made by another method—now cold headed at great savings.
flowability is the secret . . .
SAVED . . . $20.00 PER M
Another part now cold headed. Result—stronger, free from defects—savings up to $2,000 per year.
SAVED . . . $2.50 PER M
Critical dimensions required for this screw. Now produced by cold heading from Keystone "XL" Wire.

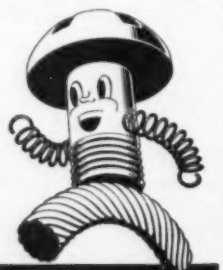
ELCO

COLD HEADING SAVES CUSTOMERS TIME AND MONEY

Elco Tool and Screw Corp., cold heading specialists of Rockford, Illinois, have helped their customers save thousands of dollars. Four case histories are shown above—where cold heading replaced other forming methods at great savings.

The *flowability* characteristics of Keystone "XL" Cold Heading Wire has solved some of the toughest and most extreme heading problems. Because of this feature, Keystone "XL" Wire results in a better finished product, free from defects, greater die life, longer runs and lower costs. Keystone quality now makes it possible to cold head parts that were formerly hot headed or machined.

Keystone does not cold head parts, but your cold heading source can tell you how you can save important dollars in time and materials when the right wire—Keystone "XL" Wire—is applied to your fastener or parts problem!



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He knows the problems of the cold heading industry. He can help you apply the right wire to the job. For immediate information, send for new booklet—"*Facts About Cold Heading Wire.*" Write to . . .

KEYSTONE STEEL & WIRE COMPANY, Peoria 7, Illinois

KEYSTONE WIRE for Industry

the manufacture of cleaning compounds.

In dilute solution, Isomal can be employed to detect pin holes or defective areas in tanks, pipes and hydraulic systems without the danger and expense of using organic solvents.

Good Wetting Properties

Manufacturing techniques give Isomal a lower surface tension with unmatched wetting and rewetting properties.

It is reported to have a broader range of solubility in water and nearly all organic solvents than ever before possible with any surface active agent. It is easily dispersed in alcohol, acetone, petroleum solvents, oils and chlorinated solvents in practically any type of application.

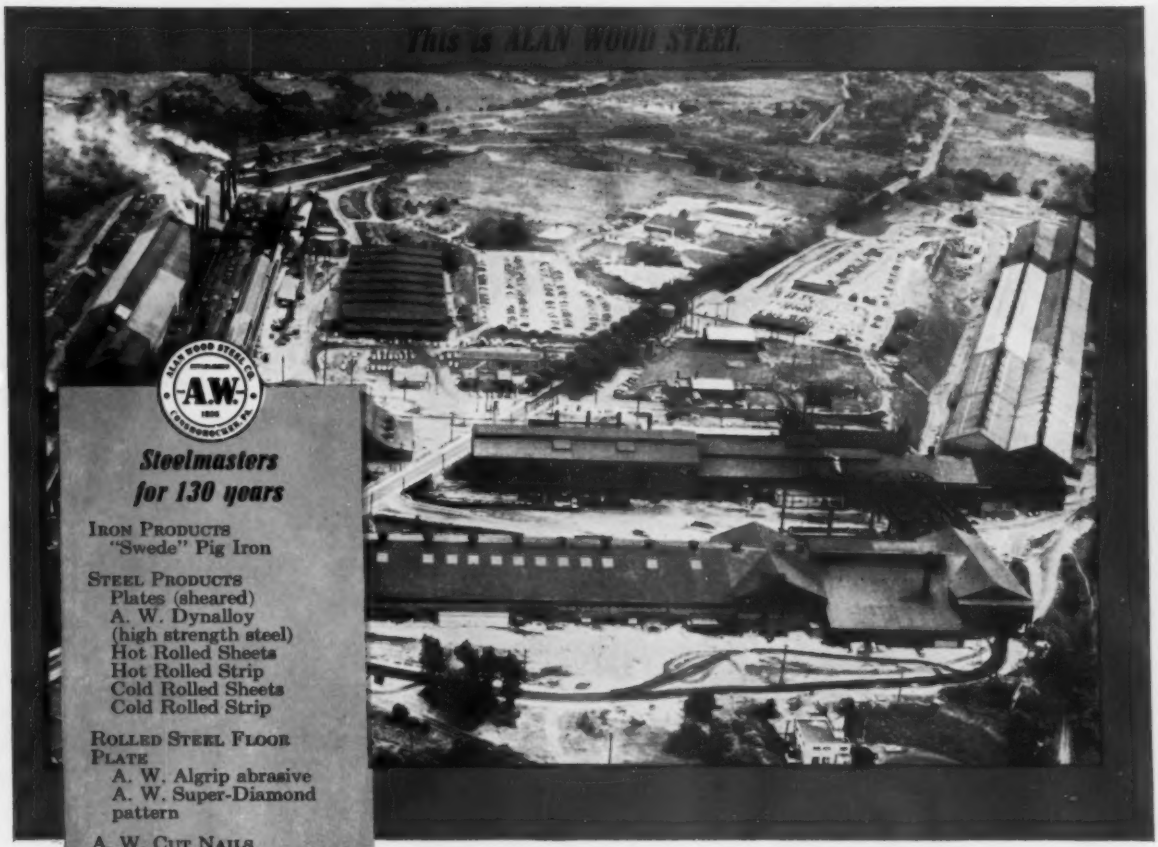
Clear in appearance, Isomal 265 has a neutral pH factor and a specific gravity of 1.088 at 60°F. It is approximately 65 pct active and mildly pleasant in odor.

Coating:

Flame-plating of mandrels ups production 74 pct.

By flame-plating wire forming mandrels with tungsten carbide, one manufacturer reports increasing production by 74 pct. These wire forming tools slide in a horizontal plane to make a wire spring or clip around a vertically positioned mandrel.

A hard, wear-resisting coating of tungsten carbide was flame-plated on all surfaces of the forming tools which come in contact with the spring wire stock. The flame-plated tools were reported to last ten times longer in operation than the previously-used hardened tool steel parts. In addition, it was discovered that machine speed could be increased from a normal 45 pieces per minute to 78 pieces per minute, amounting to a 74 pct increase in production. The four flame-plated forming tools were left in as coated condition (about 125 microinches rms). However, the tungsten carbide



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For information on Alan Wood Steel and its products, write Marketing Division—Department AW-47.

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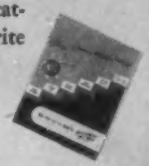

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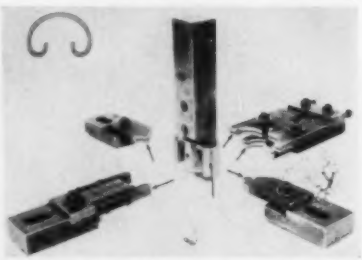
coating on the vertical mandrel was brush finished to 50 microinches rms to provide a smoother surface.

No Distortion Found

Flame-plating is a service of Linde Air Products Co., Div. of Union Carbide and Carbon Corp.



Surfaces and grooves of wire forming tools are flame-plated.

Tungsten carbide coatings can be flame-plated on most metals without danger of distortion for the temperature of the base metal seldom exceeds 400°F during the coating operation. The coating may be finished to 0.5 microinches rms by diamond grinding and lapping or left in as coated condition where tolerances permit.

Metal Finish:

Aluminum wire anodized for electrical uses.

A new process of anodizing aluminum wire with alternating current to give it a ductile oxide coating which in effect becomes an electrical insulation, has been announced. This development with reported implications in the design of electrical motors and other electrical equipment through use of lightweight anodized aluminum wire was disclosed by Aluminium Ltd., Montreal, Canada.

New horizons in design are open to electrical equipment manufacturers as a result of this development, Aluminium said.

Electrical equipment wound with light, heat-resistant aluminum wire could be made smaller, cheaper and lighter, and could run hotter, it was pointed out.

Aluminium said that solutions

to the few remaining technical problems in the wide use of anodized wire are being sought in cooperation with American electrical equipment manufacturers.

Production Obstacles Licked

Developed in Canada by the Aluminum Co. of Canada, principal subsidiary of Aluminium Limited, the process involves pulling the aluminum wire through tanks containing chemical solutions which quickly give it a hard thin, coating.

Research by company metallurgists overcame two major obstacles, the firm states.

They devised a process capable of providing an insulated film at commercial speeds.

In addition, they developed an anodic film sufficiently ductile to withstand the stressing and flexing operations involved in winding electrical coils.

Lack of these properties has prevented the use of anodized aluminum wire for this purpose in the past.

Anodic Film Insulates

The possibility of using anodic films as an electrical insulant for aluminum has been investigated for years. Aluminum oxide, which is built up by anodizing, is an insulator that maintains its insulating properties at very high temperatures. Other insulating materials used on magnet wires for winding electrical machines are organic. Therefore, Alcan says, they lose their insulating properties rapidly if temperatures rise above 80 or 100 degrees centrigrade.

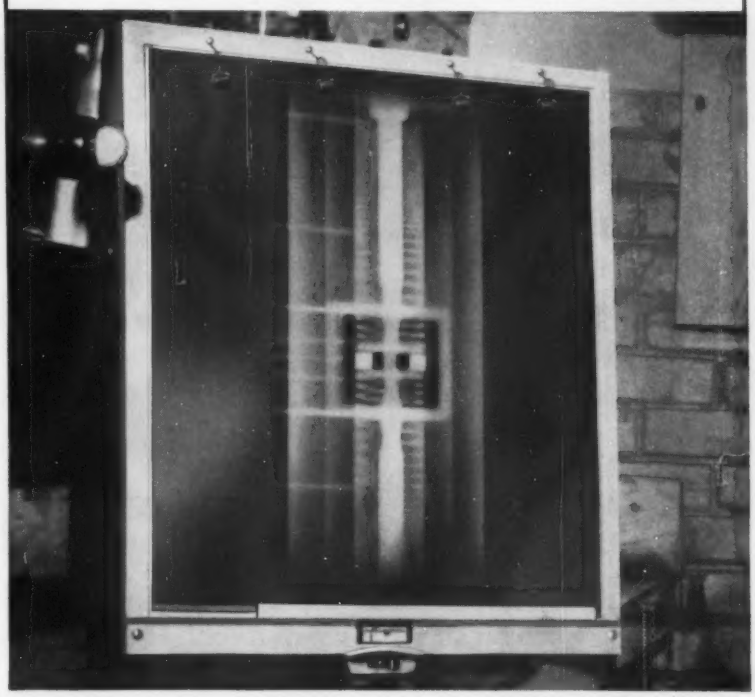
Materials:

Copper covered wire defies sleet storm.

Combination of sleet and freezing rain failed to produce any breaks in an Alaskan line of copper covered steel wire. The storm resulted in the accumulation of extremely heavy loads of ice on important open wire telephone lines near Anchorage. The thick-

THERMALLOY* quality control at work

hell box



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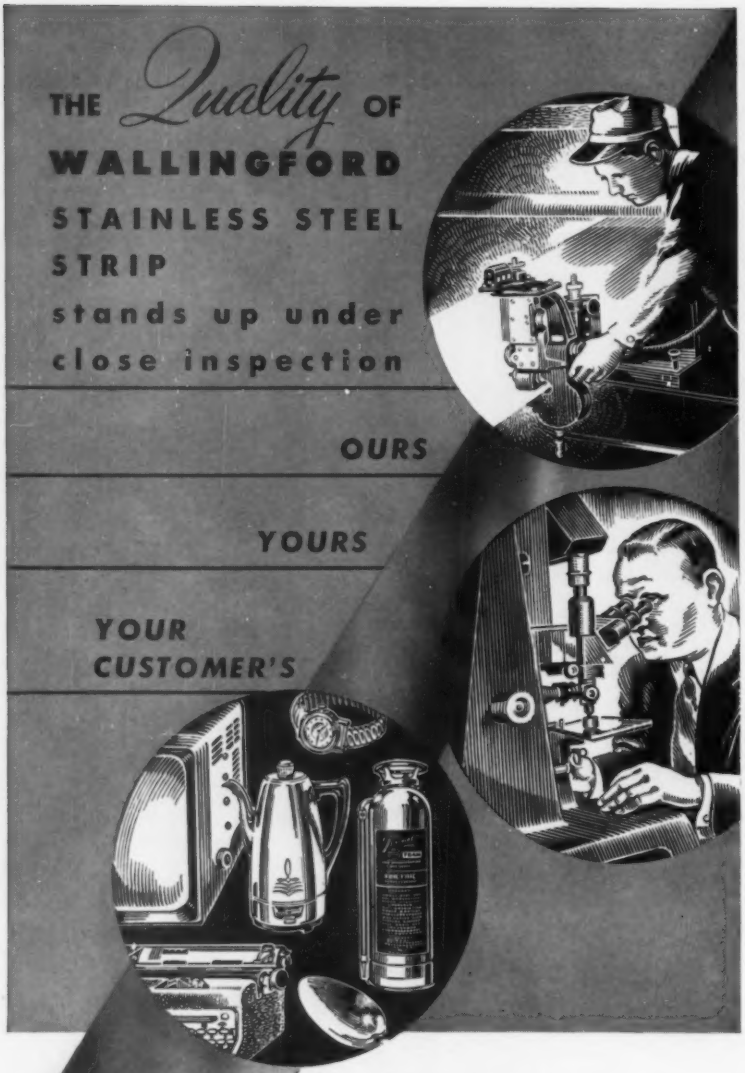

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ness of the ice formed on the wires measured from 2 to 14 in. in diameter. Yet, no breaks occurred in the wires. According to William W. Ege, Vice President in charge of the Wire and Cable Division of Copperweld Steel Co., this thickness of ice is believed to be an all-time record anywhere.

Heavy thickness of ice coats wire but no breaks occur.

The wire was 0.128 in. in diameter (about ⅛ in. wire) and span lengths were 155 ft between the poles. Ice weight is described as being 60 lb/cu ft or 4½ ton on each span.

Wire on over 2000 miles of these lines built along the Alaska Highway in 1943 was manufactured locally in mills of the Copperweld Steel Co. in Glassport, Pa.

Plating:

Orderly plant layout speeds processing

An orderly arrangement of plating equipment reportedly enables Westinghouse Electric Co. to process thousands of electronic parts daily in any of 16 different ways at its Air Arm plant in Baltimore.

Westinghouse coordinated equipment layout and operating procedures for this plating room with engineers from Hanson-Van Winkle-Munning Co., Matawan, N. J., the company which supplied the processing equipment.

Three tanks are for electrocleaning, cold rinsing and pickling. Tin, cadmium and zinc plating barrels are at the end of the processing line. Another line handles electrocleaning nickel and chrome plating. All tanks are arranged so that metal parts are routed as quickly as possible through the various processes.

Tank arrangement is designed for fast routing of work.

Westinghouse cleans, anodizes and plates hundreds of different metal parts in this shop. These parts — which include small flat work, chassis, screws, nuts and fixtures — are used in the manufacture of search-and-track radar and other electronic equipment.

Corrosion:

Velocity's part in metal corrosion explained.

Velocity can be a major factor in the corrosion of metals, Dr. H. R. Copson, of The International Nickel Company, Inc., stated in an address before the annual meeting of the National Association of Corrosion Engineers in New York City. He said that like most factors influencing corrosion, the effects of velocity are varied and sometimes appear conflicting.

An increase in the rate of movement of the environment past a metal part usually increases the corrosion by supplying the corrosives at a faster rate, the speaker noted, adding that the corrosives can reach the metal surface more readily because the motion thins or removes any quiescent layers at the metal surface.

On the other hand, uniform motion may be beneficial because it makes the exposure conditions more uniform, and thus may prevent local attack and pitting. Some motion is definitely beneficial if inhibitors are present. In the extreme case, high velocity may induce passivity and stop all corrosion.

The more damaging effects of velocity are often due to turbulence, Dr. Copson said. The turbulence may set up differential

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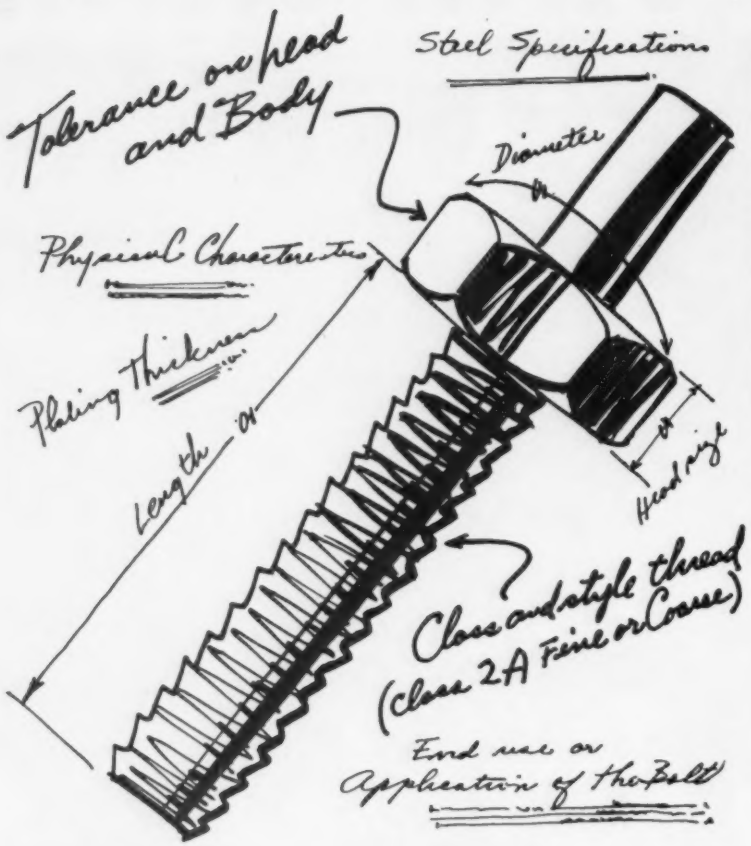

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aeration cells and metal ion cells which lead to rapid local attack. The turbulence may form anodic areas by eroding away thin protection films, in which case the attack is called erosion-corrosion. A high ratio of cathodic area to anodic area increases the rate of penetration in these cases.

Velocity effects are different on different metals, the speaker said, and accordingly the galvanic behavior of couples may be changed greatly. Actual erosion of metal can be caused by very high velocities, particularly if solids are present. Related to velocity effects is the damage caused by cavitation-erosion.

Dr. Copson is in charge of the Corrosion Section of the International Nickel Co.'s Research Laboratory at Bayonne, New Jersey.

Joining:

Combined brazing-hardening aids jet engine valves.

Simultaneous brazing and hardening performed after finish machining reportedly provides high quality at low cost in the making of jet engine water-alcohol check valves.

These stainless steel water-alcohol check valves, used in the General Electric J-47-25 turbojet engine, feature high strength and simplified construction as well as heat and corrosion resistance at critical joints.

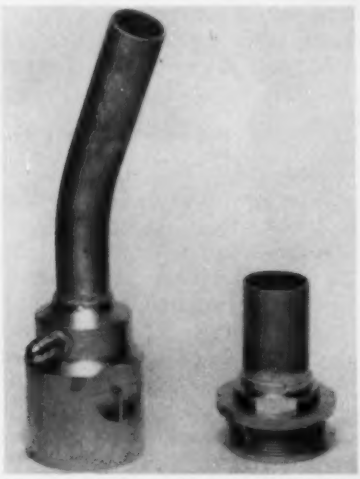
Final assembly of the two major valve sections was performed by the Stainless Processing Div. of Wall Colmonoy Corp., Detroit, for United Aircraft Products, Inc. Production in quantity by a unique furnace brazing method achieved unusual dimensional accuracy and low assembly cost. The techniques used make possible simultaneous brazing and hardening of the finish machined parts under positively controlled conditions.

Better Joint Produced

The Nicrobraz brazing alloy used to assemble the valve components is described as producing

a joint having a tensile strength equal to that of the parent metal at temperatures up to 2000°F. Components were finish-machined and threaded prior to brazing because of the Nicrobraz method which holds distortion to a negligible value.

The valve is located at the top



Two major sections of turbo-jet valve after brazing.

of the forward end of combustion engine section and connects that section to the aircraft line. It must withstand 450 psi operating pressure and must be capable of absorbing repeated shocks due to sudden internal quenching by the fuel mixture after soaking in the 600°F atmosphere of the combustion area.

Research:

Search for inorganic bond underwritten

Search for an inorganic bonding material has led to earmarking nearly $100,000 for research, reports the Steel Founders Society.

The Society's Technical and Research Committee has awarded a contract to Horizons Inc., Cleveland, specialists in research and development in the fields of metallic and non-metallic materials, to carry out the present search for such a suitable inorganic bonding material.

Horizons is to study the prop-

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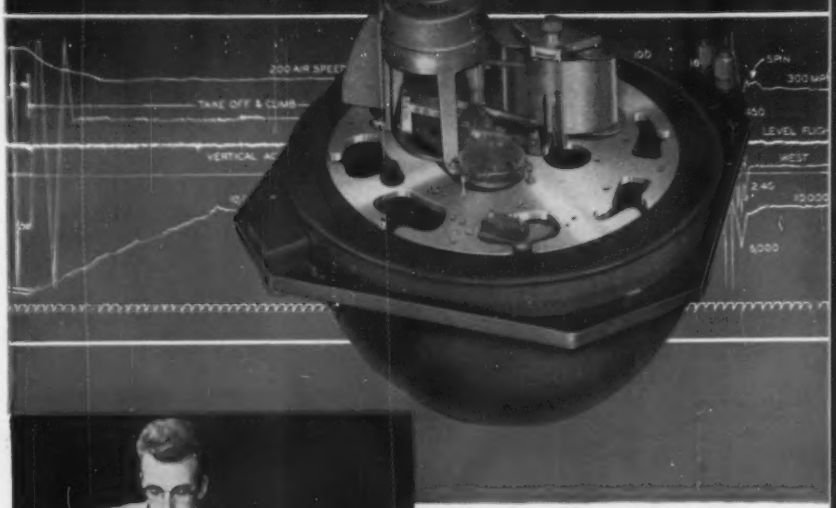

Spun spheres protect mechanical fingers of world's toughest recorder

another example of Spincraft's "start-to-finish" fabrication

15 Different Operations —

The sphere, protecting the delicate sensing instruments, is completely fabricated by Spincraft. The sphere consists of an outer steel and inner aluminum shell separated by insulating material. The two hemispheres are joined together by an ingenious locking and sealing arrangement. Spincraft's complete fabricating responsibility involved spinning, machining, arc-welding, spot welding, brazing, grinding, sawing, drilling, braking, stamping, phosphate plating, anodizing, painting, assembly and pressure testing. Craftsman (above) is shown assembling a Flight Recorder.

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This aircraft Flight Recorder, manufactured by the Mechanical Division of General Mills, etches a continuous 300-hour record of heading, air speed, vertical acceleration and altitude on aluminum foil. Each Recorder is fully-enclosed and protected in a specially fabricated sphere — made by Spincraft. The recording device, when enclosed in the sphere, is designed to withstand shocks of 100G's and resist temperatures of 2000°F up to 30 minutes.

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erties and behaviors of potential inorganic bonds, and develop materials and processes suitable for bonding molding materials for the production of steel castings.

Bonding materials being used in the foundries today consist in the main of clay, organic materials and water, the Society states. In some cases, as in shell molding, the bond is merely an organic material.

Present Problem Cited

Molten metal coming in contact with present organic bonds reacts to produce large quantities of gas. Methods in use today involve complex procedures and the use of expensive materials to overcome these problems. The purpose of the research project is to seek materials and procedures that will eliminate certain steps and simplify the procedure and will, at the same time, produce a higher quality result.

Horizons is to find an inorganic material, other than clay, which will produce a strong accurate mold; which will remain an effective bond at the molten steel temperatures up to 3150°F; permit rapid mold curing; cause molds to be pyroplastic, lose brittleness at high temperatures and yet retain shape; disintegrate easily after casting; keep the mold and bond gas-free; remain inert in the molten metal environment and not contaminate the metal; be readily available, economical and have such properties as to permit ready fabrication of a mold at room temperature either by ramming, slurry molding or blowing.

Steps Planned

The first step in the program will be the examination of the various bonding materials which fall into such categories as soluble silicates, inorganic gells or concentrated dispersed-phase systems, hydraulic cements, borates, and phosphates. Once compositions and processes have been developed, the materials will be subjected to tests for setting time, green strength, baking conditions,

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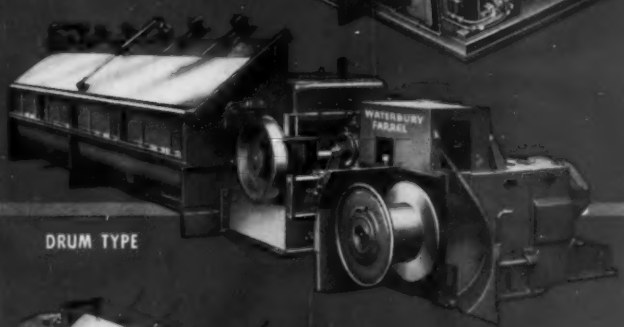

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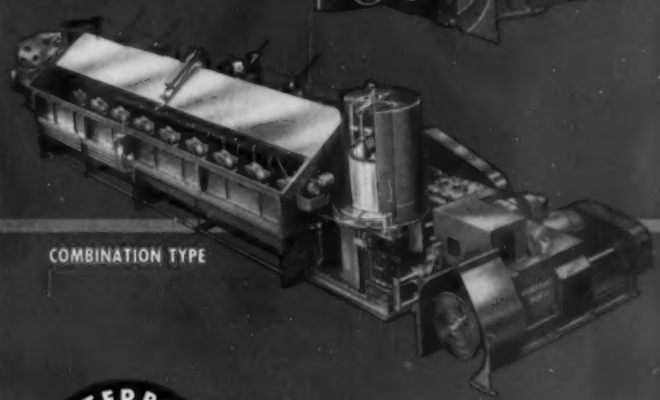

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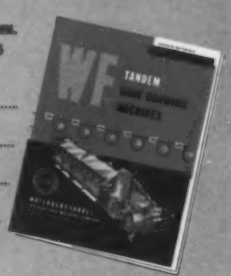

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baked properties, thermal shock resistance, properties at high temperatures, dimension and size stability during curing, gas evolution, reactivity with molten steel and mold erosion.

Machining:

New process developed for working plastics

A new process, described as having many important advantages in the production of high precision machined plastic parts, has been announced. Using conventional Swiss automatic screw machines and other conventional machining equipment, Standard Automation Products, Havertown, Pa., machines many plastics under controlled ultra-low temperature and atmospheric conditions.

The types of plastic parts which can be produced using this Cryogenic process include pinions, arbors, axles, toothed wheels,

Typical plastic parts now machined by the new method.

gears, shaped parts, nuts, screws, and compound parts. The process is effective for producing large plastic parts as well as miniature and subminiature prices.

Get Better Tolerances

Advantages of this method are described as significant improvement in dimensional stability and tolerances obtainable, lowered costs due to reduction in rejects, faster rates of production, more uniform parts, better surface finishes, and elimination of some secondary finishing operations. The new process is mentioned as useful in producing parts from plastics which have a high coefficient of thermal expansion.

Inspection:

Electronic recording gage speeds gun barrel output

Production on a 20 mm machine gun barrel line has been boosted through the use of a unique electronic recording gage. The unusual gage, designed and built by the Cleveland Instrument Co., checks three separate tapers in the chamber of the barrel at the Ordnance Div. of E. W. Bliss Co., Canton, Ohio.

As the technician checks the OD of the barrel with a standard snap-gage indicator, the gaging tips, mounted on a special motor-driven platform, move into the chamber. The movement of each tip is continuously recorded on the graph and copies of the graph accompany each barrel upon shipment. The chamber requires the measurement of 5 datum diameters which are recorded in 0.0001 in.

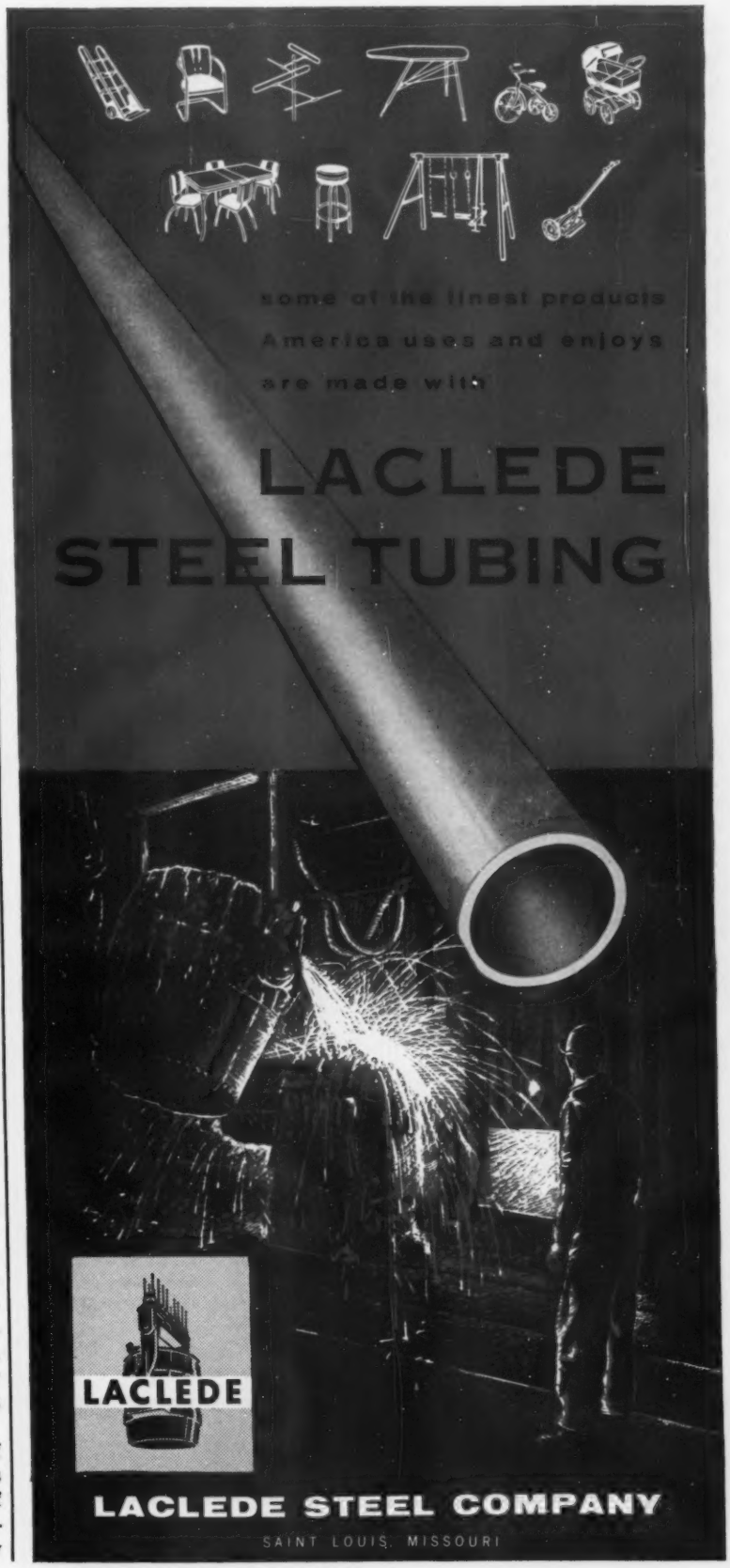
Metals:

Stainless steel is a success in aircraft honeycombs.

Use of stainless steel has reportedly solved the production problem of getting a honeycomb structure for aircraft which combines good strength-to-weight ratio with high resistance to the temperatures experienced in supersonic craft and guided missiles. American Silver Co., Flushing, N. Y., cite the substitution of stainless steel of hitherto unobtainable thinness for aluminum facing and core as the answer.

The substitution of stainless steel for aluminum is made possible by rolling the steel strip to one-third the thickness of the aluminum foil. Formerly, aluminum was employed in thickness ranges from 0.003 in. to 0.006 in. Now aluminum is replaced by stainless steel in thickness ranges from 0.001 in. to 0.002 in.

Since the specific gravity of aluminum is 2.70 and stainless steel approximately 7.80, the use of the thinner stainless steel strip produces a honeycomb of substantially



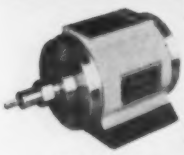
the same weight as the aluminum honeycomb formerly used.

However, the increased strength of stainless steel provides a greater strength-to-weight ratio for the honeycomb as well as adding the required resistance to temperatures up to 1200°F. The resultant sandwich structure shows superior tensile, compressive, and shear strength plus enhanced dimensional stability, and moisture resistance.

In planes, honeycomb structures made with stainless steel cores and facings are described as exhibiting excellent surface conditions after rigorous field tests. Contributing to this satisfactory performance is the stiffness of the sandwich skin surface and relatively small movement in the joints due to a structure which is completely welded and brazed.

Service tests have included: normal and accelerated weathering tests, salt-spray tests and accelerated corrosion tests.

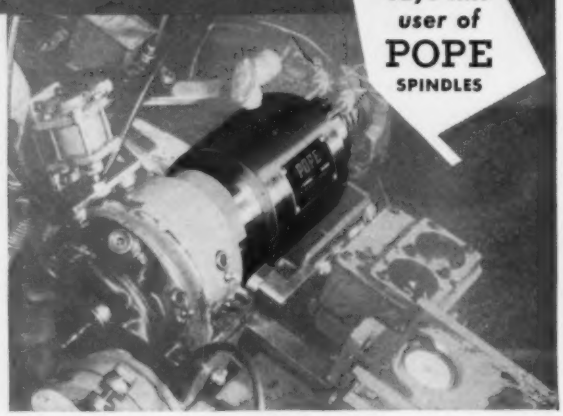
"over 14 billion revolutions and still going strong"
"50% more wheel life" "better surface finish"
"way better wavometer readings"
says this user of POPE SPINDLES



THIS IS THE SPINDLE for Quick, Low Cost Maintenance

You can disassemble, replace the bearings, reassemble and get this spindle back into operation in less than one hour, without removing the spindle housing from its set-up position — another cost-saving feature of Pope Hi-Cycle Spindles.

This rugged, long-lived Pope Spindle has the rigidity, both radially and axially, for continuous production of accurate parts. Spindles of similar design available for higher speeds.



THE FAFNIR BEARING COMPANY operates POPE Heavy Duty, 72,000 RPM Hi-Frequency Wheelheads on No. 1 Landis Grinders for extra precision ball bearing race grinding.

Fafnir considers the extraordinary record of these POPE wheelheads in their own plant an outstanding example of both *spindle* performance and *bearing* performance, for complete *Fafnir* ball bearings are used in these Wheelheads.

What about *your* grinding operations? Do they call for fine surface finishes, uniformly dependable performance and trouble-free operation over long periods? If so, you need the engineering ingenuity and skilled craftsmanship, and the precision ball bearings, that you'll find in POPE Precision Spindles.

Write for specifications and quotations

THESE ARE THE BEARINGS

A pair of Fafnir Super-Precision MM20TW1-CR spring loaded ball bearings are used in the Pope Hi-Cycle Wheelhead.

No. 109

Specify POPE PRECISION SPINDLES
POPE MACHINERY CORPORATION
Established 1920
261 RIVER STREET · HAVERHILL, MASSACHUSETTS

Joining:

New stud fastener betters insulated sandwiches

Faster field-assembly and improved appearance of insulated metal sandwich and other curtain walls are credited to a new stud welded construction fastener with an aluminum cap. Developed by the Nelson Stud Welding Div. of Gregory Industries, Inc., Lorain, Ohio, the new fastening system employs a steel shoulder type stud with serrated tip which is end welded to structural girts with a Nelson and stud welding gun.

In sandwich-type construction, the inner skin (usually corrugated aluminum, but sometimes a flat sheet or formed pan) is impaled over stainless steel, cadmium plated or mild steel studs and speed clips are applied to hold the inner material firmly in place.

Insulation Impaled

Fiberglas insulation is then impaled over the studs and the exterior material, frequently ribbed panels of 0.032 in. embossed aluminum, is next impaled with a

Studs, end welded to girts, permit speedy wall erection.

hard rubber hammer, so that the sheet rests firmly against the shoulder of the stud.

The aluminum cap is then placed over the serrated tip of the stud and driven into position with a tool which causes the aluminum to flow into and grip the serrations. Tests have demonstrated, states the manufacturer, that this fastener, when in place, has a holding power of more than 800 lb. on a direct pull.

Rust and galvanic action are

prevented by the use of the new granular flux-filled studs and the aluminum caps which are used to secure all of the wall components in field-assembled, insulated sandwich curtain walls.

Handling:

Stud welded to billet simplifies tonging

Production of forgings has been increased appreciably and costs per forging have been reduced through use of end welded studs as tong holds at the Taylor Forge & Pipe Works, Fontana, Calif.

A single threadless stud, 1 in. in diam and 2 in. long, is quickly end welded to each forging billet to provide a clean, firm tong hold by which billets are handled in

Obtaining clean, firm tong hold is aim of welding.

forging hammers. Formerly, it was necessary to roll billets to form tong holds and billets thus had to be larger to provide the extra steel for the tong hold.

Less Operator Fatigue

Other benefits of stud welding include a reduction of hammerman fatigue, through elimination of the rolling operation, and increased die life. Since production is faster, there is less temperature drop during the entire forging operation.

A Nelson heavy-duty stud welding gun is used, with three power units connected in parallel. This equipment is made by the Nelson Stud Welding Div., Gregory Industries, Inc.

OUR ERIE STRAYER BUCKETS WORK LONG HOURS, NEED LITTLE SERVICE

Reports Max Dozoretz, Partner, Lancaster Iron and Metal Co.

Clamshell buckets are put to many tough jobs. Probably the toughest is handling scrap metal. The constant brush of steel against steel lays up the ordinary bucket for frequent repairs and soon wears it out.

But not an Erie Strayer bucket! Mr. Dozoretz knows Erie Buckets. He has two of them on the job constantly. He says, "We work our Erie buckets hard—eight to ten hours a day, six days a week. We know they'll deliver full payloads with every pass.

"And we lose no time for maintenance! Our first Erie bucket has been in service, continuously, for six years now and is still going strong."

Compare the Erie with any other clamshell. You'll quickly note its finer engineering and the rugged construction that has made it the bucket preferred by experienced operators everywhere.

These Erie Features Mean More Days of More Work

1. Top closing power from block and tackle, plus lever arm construction, plus precision balancing.
2. Manganese steel teeth and high carbon steel lips that bite up full payloads of even toughest clay and gumbo.
3. Rigid, one-piece, welded head that shrugs off bumps and jars. No shimmy. No wobble.
4. Two-line, continuous reeving. Adds up to 50% to cable life. Less down-time for reeving.
5. Low head room for fast work in tight quarters; low center of gravity for easy positioning.

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BUCKETS THE WORLD OVER

For catalogs, write Dept. A46

ERIE STRAYER CO.

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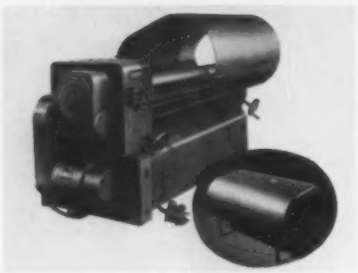
NEW EQUIPMENT

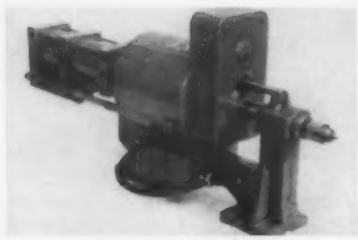
New and improved production ideas, equipment, services and methods described here offer production economies . . . for more data use the free postcard on page 117 or 118.



Built for rapid forming of obround and rectangular shapes

One line of slip roll forming machines are now built in modified models for rapid forming of obround and rectangular shapes. With this equipment, the manufacturer states, the units can alternately produce curved and flat surfaces for high production of obround tanks and containers, round cornered rectangular pipe sections and similar objects. On the firm's 6 in. diam machine, the rear roll is positioned pneumatically between two limits to alternately form curves and flats. On smaller diameter machines, the rear roll action is mechanical. *Niagara Machine & Tool Works.*

For more data circle No. 30 on postcard, p. 117



Driller has separate control on spindle feed and speed

The Model 113 automatic drilling unit has an electric motor-driven spindle and hydraulically controlled, air operated quill feed. Its spindle feed and speed are described by the maker as under separate control for any combination of feed to speed. Spindle travel is powered by an inline double acting air cylinder, while feed rate is controlled by a closed hydraulic system. An induction type motor with timing belts provides speeds from 865 to 13,800 rpm. The chuck capacity of the unit is ¼ in. *Electro-Mechano Co.*

For more data circle No. 31 on postcard, p. 117

Quench tank unit contains one tank within another

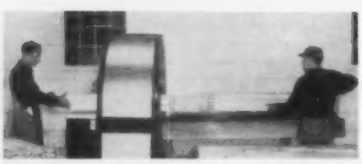
Described as a new development in the heat treating field this air-operated quench tank consists of one tank within the other. The outer tank is higher than the inner tank and somewhat larger in diameter. A pump is provided on the oil tank for circulating the oil. The inner oil tank is filled to overflowing and the outer tank to a point above the cooling coils. The pump takes the oil from the outer tank and pumps it into the bottom of the inner tank, thus forcing the oil over the top of the inner tank and back to the cooling section. The tanks are mentioned by the manufacturer as not requiring pit settings or special installation. *Waltz Furnace Co.*

For more data circle No. 32 on postcard, p. 117

Buffing and polishing lathe provides wider swing

This 2-spindle, variable speed buffing and polishing lathe is said to incorporate a wider swing. The unit has a swing of 20 in. from side of base to face of inner flange. Its spindles operate independently, each having its own motor and variable speed control. This is described as permitting the operator to change wheels or vary speeds. *Hammond Machinery Builders, Inc.*

For more data circle No. 33 on postcard, p. 117



Strapper can apply over 700 straps per hr

This high speed electric girth strapping machine is described as capable of applying in excess of 700 straps per hour, while at the same time automatically compressing the material to be strapped. Packages up to 12 in. x 12 in. with no limit on length can be handled by the unit. *Parmacel Tape Corp.*

For more data circle No. 34 on postcard, p. 117

How BRAINARD STRAPPING SERVICE cut pipe handling costs 20%

FIVE TONS of cumbersome pipe, held by four bands of ¾" .035 Brainard strap, are safely moved by overhead crane to a gondola car at the Sharon Tube Co., Sharon, Pa. . . . with a 20% saving in manhours and materials! Entire gondola car is then secured with 1¼" .035 Brainard strap. Loading time has been cut 60% from previous manual operations.

A Brainard expert worked out this successful, cost-cutting operation. No matter what you make, package or ship, a nearby Brainard representative can show you the way to similar savings. Call him today, or write . . .

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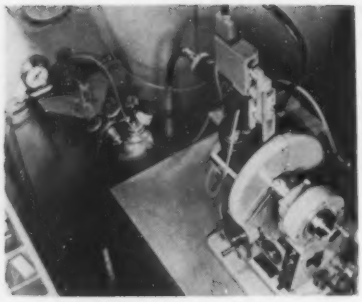
Warren, Ohio

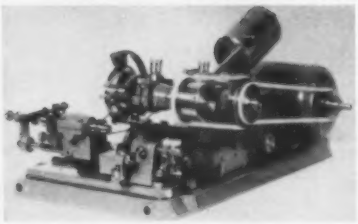
MAKERS OF QUALITY STEEL STRAPPING



Flow counter lowers spectrograph range to magnesium

This flow proportional counter, described as detecting and measuring all elements down to and including magnesium, is reported as extremely sensitive, with a counting rate exceeding 60,000 counts per second for soft radiation and incorporating excellent reproduction qualities. It was developed for use with the company's standard X-ray spectrograph and helium attachment when the latter is required. A special harmless gas flows through the interior of the counter. When X-ray beam is surrounded by helium atmosphere, one side of the counter window is in contact with special gas and the other with helium. *North American Philips Co.*

For more data circle No. 35 on postcard, p. 117



Swiss-made burnishing machines being introduced

These units, designed for use in the watch and precision instrument industries, are now being introduced in this country. The illustrated machine is available with foot pedal or hand lever switch. Adjustable for a wide range of work, it features size control and rapid chucking. Max workpiece length is approx. 3 in.; machine weight, 55 lb. Another model has workpiece length of 4 in.; weighs 98 lb. *Rudolph Koppel Co., Inc.*

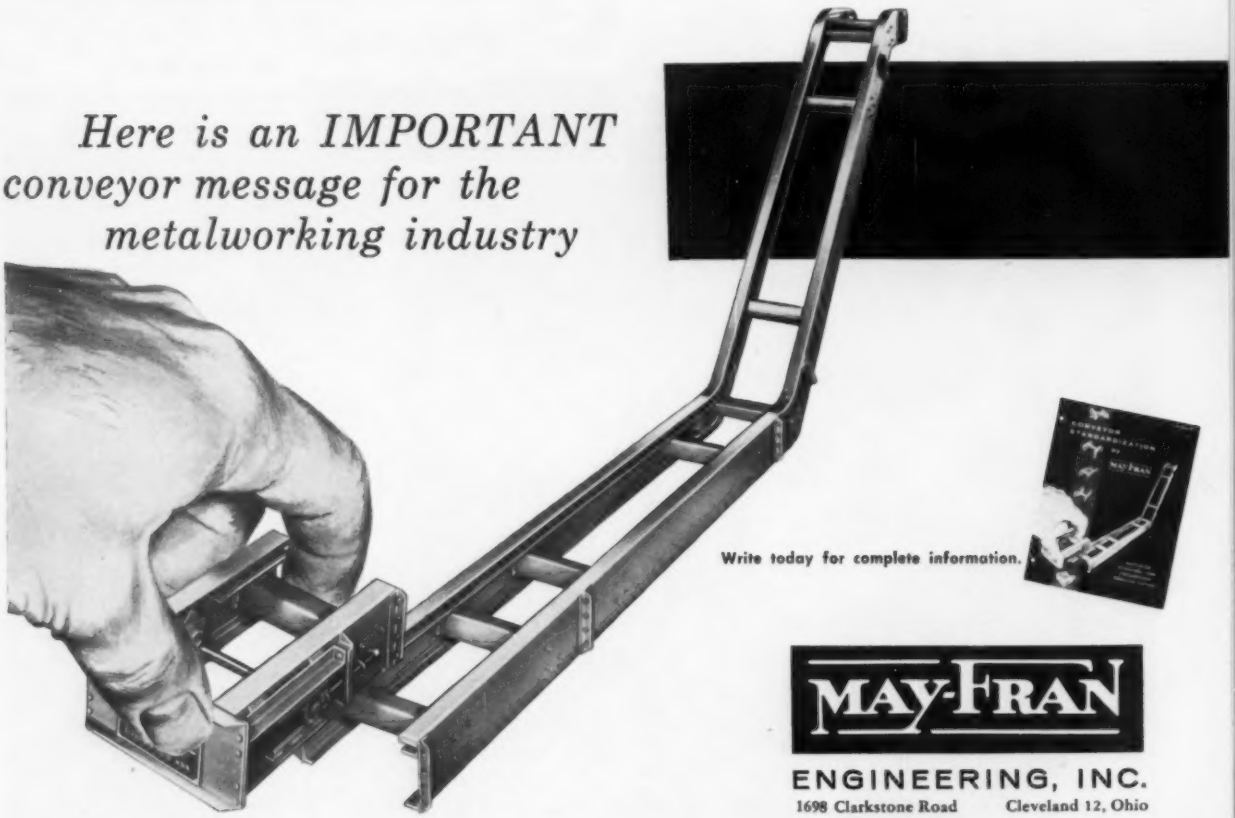
For more data circle No. 36 on postcard, p. 117

Transfer unit completes 73 operations on gear carriers

This multi-station transfer machine performs 73 operations on differential gear carriers. They include: 8 milling, 8 boring, 2 cross-facing, 1 turning, 18 drilling, 10 spotfacing, 7 chamfering, 2 reaming, 9 tapping and 8 probing. A washing and drying unit for cleaning fixtures is included. *Cross Co.*

For more data circle No. 37 on postcard, p. 117

Here is an IMPORTANT conveyor message for the metalworking industry



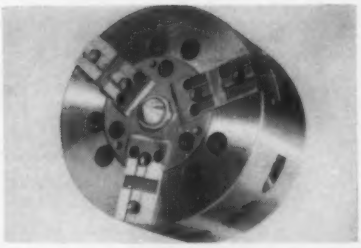
Write today for complete information.

MAY-FRAN

ENGINEERING, INC.

1698 Clarkstone Road Cleveland 12, Ohio

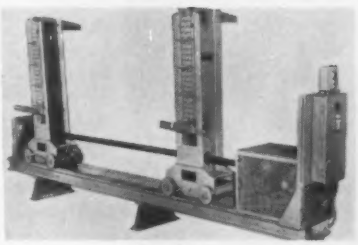
Chucks designed for high speed, heavy duty cutting



Recommended for use to drive work on centers when high speed, heavy duty cuts are required, these chucks have forged steel bodies. They are available in 8, 10, 12 and 15 in. rated sizes for direct mounting on American Standard Types A-1, A-2, B-1 and B-2 flanged spindle noses. The compensating action is described by the maker as achieved through 3 levers and a floating rocker. When power is applied, the draw bar pulls the rocker resulting in an actuation of the 3 levers and 3 jaws. *Skinner Chuck Co.*

For more data circle No. 38 on postcard, p. 117

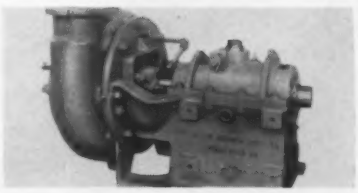
Adjustable bar unloader has variable speed control



Capable of being adjusted to handle pieces from 3 ft to 12 ft in length and from 1½ in. to 3 in. in diam, this bar unloader can be operated at a variable rate of speed. Described as simple in operation, the bar or tubing flows from the production machine into a V-shaped trough which is tripped to one side as the piece leaves the machine. Work falls down incline until picked up by cleats of elevating conveyors operating in unison. Then it is lifted to other side and into tote box. *Feedall, Inc.*

For more data circle No. 39 on postcard, p. 117

Centrifugal pumps transport abrasive materials



An improved line of centrifugal-type pumps are designed for transporting mixtures of abrasive materials such as ash, slag and fly ash from power plants. One type employs rubber or neoprene, while second type employs hard metal alloy wearing parts for sharp edged solids. *Allen-Sherman-Hoff Co.*

For more data circle No. 40 on postcard, p. 117

NOW YOU CAN ASSEMBLE YOUR OWN "CUSTOMIZED" CONVEYORS FROM PRE-FABRICATED STANDARD SECTIONS.

If your plant produces stampings, formed metal parts, castings or forgings . . . if you have a byproduct such as automotive scrap, chips and turnings . . . the MAY-FRAN conveyor standardization program will provide your company with savings never before possible.

Through standardization, MAY-FRAN now makes it possible to assemble individual components into virtually any type of conveyor to handle a wide range of products or materials. Straight sections . . . concave or convex sections . . . take-up charge sections and discharge-end sections can be furnished to meet specific requirements of belt width as well as load bearing and volume capacities.

Even after they are installed, MAY-FRAN conveyors can be dis-assembled and re-assembled in other plant locations . . . to handle other products. Standardized conveyors can be lengthened, shortened or modified in almost any way . . . and at minimum cost.

Pre-fabricated conveyor sections can be furnished rapidly and inexpensively. The individual components provide users with the ultimate in flexibility. MAY-FRAN hinged-steel conveyor belting is used on the Standardized units. Belting is available in widths from 6 inches to 6 feet in any length. Solid and perforated links are available in pitch lengths from 2½ to 9 inches.

MAY-FRAN . . . a name long recognized in the materials handling field . . . is first again with standardized components for your customized installations.

6839-MF

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DEBURRING

• Deburring of gears isn't normally included in specs or drawings. And we don't get paid for it. But here at BRAD FOOTE we take pains and expend many man hours on deburring—for we know that one tiny burr can ruin a $100,000 machine.

• Examine your next shipment of gears. See whether your present supplier is painstakingly removing all the burrs. Find out how many hours your assembly department has had to charge against deburring. See another way in which BRAD FOOTE quality and extra attention to details saves you money.

• Prove to yourself the savings that BRAD FOOTE quality can mean. Let us quote on the gear requirements for your next program—whether it be radar equipment, diesel engines, etc. BRAD FOOTE has experience in providing gears for almost every specialized application and would welcome the opportunity of discussing your gear problems.

BRAD FOOTE MAKES ALL TYPES OF GEARS—IN A COMPLETE RANGE OF STYLES AND SIZES

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Write Dept. B for New Catalog 54

GEO. F. MARCHANT COMPANY

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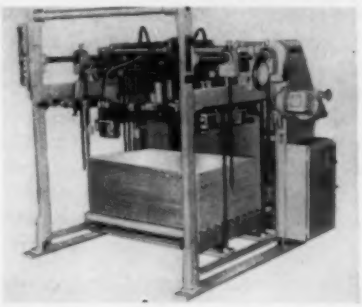
Metal feeder

This high speed metal sheet feeder is described as feeding up to 150 sheets per minute to such processing equipment as presses, coaters, slitters, shears and buffers. The unit has a 9000 lb capacity elevator. It may be equipped for either rear or side loading. A powered, fast-lowering elevator is mentioned as reducing re-loading time to approx. 20 seconds. Sheets handled range in thickness from 38 to 20 gage and in size from 19 x 19 in. to 44 x 48 in. The unit can be supplied with an independent drive or it can be driven by a power take-off from the fed machine. Feeder frame members are reinforced to support 9000 lb load. *Dexter Folder Co.*



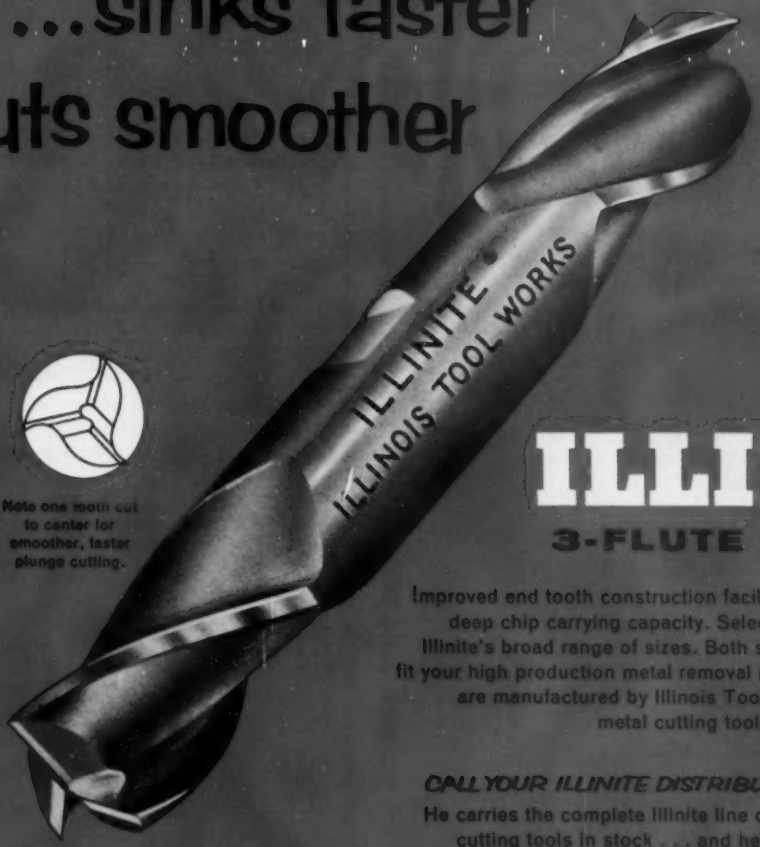
For more data circle No. 41 on postcard, p. 117

Solid insert rings

Reported use of inert-gas tungsten-arc welding of piping without backing rings, smoother root pass welds with elimination of root pass cracking and improved weld contours in thin wall piping with one or two less passes, are some of the benefits offered by a line of new consumable solid insert rings. The rings are produced for all standard or special pipe and tube sizes in diameters 1½ in. or larger. Available for mild steels, alloy and stainless steels. *Grinnell Co., Inc.*

For more data circle No. 42 on postcard, p. 117

...sinks faster cuts smoother



Note one tooth cut to center for smoother, faster plunge cutting.

ILLINITE®

3-FLUTE END MILLS

Improved end tooth construction facilitates sinking and provides extra deep chip carrying capacity. Select the 3-flute end mill you need from Illinite's broad range of sizes. Both single and double-ends are available to fit your high production metal removal requirements. Illinite End Mills are manufactured by Illinois Tool Works, a famous name in metal cutting tools for forty-four years.

CALL YOUR ILLINITE DISTRIBUTOR TODAY!

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ILLINITE...the most complete line of Standard Metal Cutting Tools—available from stock!

END MILLS • MILLING CUTTERS • SLITTING SAWS
KEYSLOT CUTTERS • HOBS • SHAPER CUTTERS
• TOOL BITS

Wire straightener

Designed to meet requirements of wire fabricators, this unit is an automatic wire straightening and cut-off machine. It is available for handling wire of diameters from 1/16 in. to ¼ in.; from 1/16 to 5/16 in.; and from ⅛ in. to ½ in. The unit's clutch and trip mechanism is for very small diameter wire. *Geo. C. Patterson Machine Co.*

For more data circle No. 43 on postcard, p. 117

Punch press utilizes set of piercing units

This new 2-ton bench press is designed to accept a manufacturer's set of piercing units with interchangeable punches and dies. The combination is described as freeing larger tonnage presses from short-run production. The press has an 8 in. shut-height to accommodate tool units punching round or shaped holes. It has a capacity of 3/16 in. diam through ⅛ in. cold rolled

steel; ⅜ in. through 16 gage and ⅝ in. through 20 gage. In the same holders these units can be adapted for punching round and shaped holes up to 2⅛ in. diam in larger tonnage presses. *J. R. Reinertson & Co.*

For more data circle No. 44 on postcard, p. 117

Wire sling

This sling saddle is a wire rope fitting designed for protecting slings and wire rope when hoisting square objects whose sharp corners might cut or damage the rope. Another

use for it is shown in the illustration. Utilizing a choker sling and sling saddle, the arrangement offered protection to the sling and safety in hoisting the assembly. *Newco Mfg. Co.*

For more data circle No. 45 on postcard, p. 117

Grinder turn table

Through this turn-table base with a quick-acting positive clamp, a grinder may be turned so that either end faces the operator in the most convenient position. This is described as facilitating instant change from roughing to finishing, without requiring the operator to move from one end of the machine to the other. *Thomas Prosser & Son.*

For more data circle No. 46 on postcard, p. 117

. . . To Your Specifications

ERIE Bolts • Studs • Cap Screws • Nuts

In Alloys • Stainless • Carbon • Bronze

Your most exacting specifications take precision form in the hands of our expert craftsmen. Bolts—Studs—Cap Screws—Nuts as specified to resist corrosion, extreme temperatures and tensile stresses are the product of more than 40 years continuous production of highest quality fasteners for a wide diversity of industries.
Send us your specifications for prompt estimate.

ONE OF THE 12 INTEGRATED COMPANIES BARIUM STEEL CORPORATION

ERIE BOLT & NUT CO.
Erie, Pennsylvania
Representatives In Principal Cities

Torque wrench

A hammering surface opposite the tang is described as enabling this torque wrench to knock out mismatched pieces of an assembly without damage. Engineered to meet critical production line torque con-

trol problems, the wrench permits a maximum torque variation of only ±2 pct under actual operating conditions. The unit is said to eliminate any need to listen for clicks or watch for lights because control is completely automatic. *Jo-Line Tools, Inc.*

For more data circle No. 47 on postcard, p. 117

Forced feed oiler

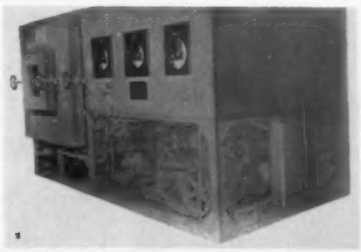
This lubricating system incorporates a 5 gal tank and 1 gpm gear pump. The circulating pump discharges lubricant through the mani-

fold to coat top and bottom of stock. Excess oil is rolled off and recirculated after screening. *Graymills Corp.*

For more data circle No. 48 on postcard, p. 117

Altitude test chamber

In connection with the extreme high heat developed by skin friction on high altitude missiles, this altitude simulation test chamber with a temperature range of from —100°F to +500°F, has been developed. The

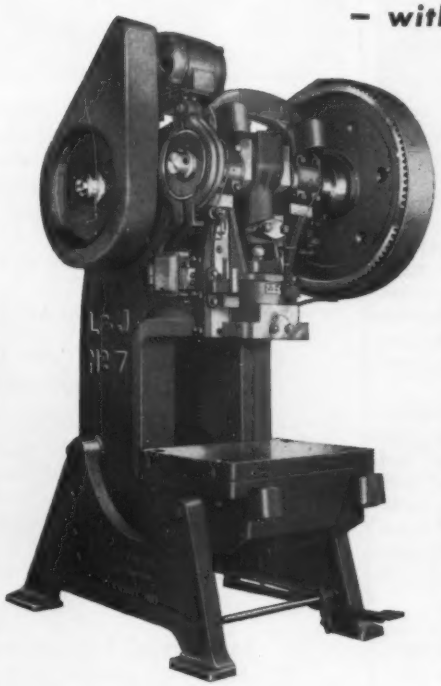


chamber incorporates a 64 cu ft test space featuring completely automatic operation, air circulation, mercury manometer calibrated in thousands of feet and a safety thermostat to protect heaters against accidental burnout. It is described as providing accurate simulation of atmospheric conditions at high altitude under ultrasonic velocities. Controls are designed to duplicate the results of rapid changes in acceleration. *American Research Corp.*

For more data circle No. 49 on postcard, p. 117

NEW L&J NO. 7 PRESS

RIGID – ACCURATE – EFFICIENT – with a LARGER WORK AREA



This new press will give you greater production at lower cost. Its alloy iron frame has exceptional rigidity which holds deflection to a minimum and gives closer tolerances, greater uniformity and longer die life. Accuracy is also obtained through adjustable gibs of extra length. The rugged ram adjusting screw has buttress threads and replaceable hard bronze seat. Air clutch optional. Geared and non-geared models.

SPECIFICATIONS

Capacity — 75 tons. **Standard Stroke** — 4". **Maximum Stroke** (to order) — 8". **Strokes** per minute —42 (non-geared type 85). **Throat Depth** center of ram to frame—13½". **Die Space*** —14" to 22". **Bolster Plate Area**—36" x 26".

* bed to ram, standard stroke down, adj. up.

Write for Catalog

Fully describes all L&J O.B.I. Presses—20 geared and non-geared models. Capacities 14 to 90 tons. Also, 20 to 50 ton High Speed, Double Crank Straight Side speeds up to 450 s.p.m. Ask for Catalog.

L&J PRESS CORPORATION
1623 STERLING AVE., ELKHART, INDIANA

MONEL•NICKEL•COPPER•ALLOYS
THIN STRIP

no standard
is too exacting

Temper requirements for the thin nickel strip (.002") used in sensitive electronic tubes were too exacting to be checked by the usual methods. So Somers carefully hand checks several samples from each lot by the ultra-precise "bend test" illustrated above.

Since 1910 Somers Brass Company has specialized in producing thin strip: nickel and its alloys below .020" and copper and its alloys below .012" with the tensile properties, fatigue resistance, drawing properties and many other requirements which only the most exacting standards of production and quality control can meet.

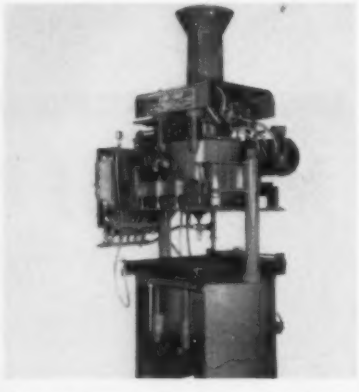
Whatever your specifications may be, why not take advantage of Somers long experience? Write for field engineer or Confidential Data Blank for a complete survey of your problem at no cost or obligation.

FOR EXACTING STANDARDS ONLY
Somers

Somers Brass Company, Inc.
WATERBURY, CONN.

Core blower

Featuring a stationary, automatic refill sand chamber, this new core blower is designed for blowing cores weighing up to 150 lb each. The sand chamber, which will accommodate 32 x 32 in. core boxes, is located directly under the sand supply hopper. It has shuttle type cut-off



that automatically opens and closes, for refilling after each blow. This arrangement is described as making for fewer and smaller moving parts and assuring perfect alignment of blow plate and core box during the blowing cycle. *Federal Foundry Supply Co.*

For more data circle No. 50 on postcard, p. 117

Rotary grinder

Designed primarily for precision die work, this rotary air grinder is described as adapted to production grinding operations in shops and laboratories and to bench duties. *Thor Power Tool Co.*

For more data circle No. 51 on postcard, p. 117

Industrial television

Manufacturer's basic TV system consists of a small camera weighing less than 5 lb, a camera control and monitor, 10 in., 17 in., or 21 in. ruggedized industrial monitors. Camera control consists of four subassemblies—video line amplifier, deflection, phantastron syno generator and electronically regulated power supply. Remote pan and tilt and lens control mechanism, remote three-lens turret, housings, and remote monitors are available. *Kay Lab.*

For more data circle No. 52 on postcard, p. 117

Somers
UNIGRAIN®
thin strip brass
for
deep drawing

Uniform fine grain size of Somers eyelet brass—less than .010 mm. (75X).

with
Fine Grain Finish

Somers Brass Company is pleased to announce the availability of a new, unique annealing process which makes possible a uniform fine grain of less than .010 mm. which can be drawn to full 40% elongation.

Developed in cooperation with the Selas Corp. of America this new process makes it possible to deep draw Somers THIN STRIP and still obtain a fine grain which is easily buffed to a brilliant finish.

And this new Selas Furnace provides high production as well as close control of temper and uniformity. It is typical of the modern equipment with which Somers produces copper, brass and other alloys to rigid specifications between .010" and .00075".

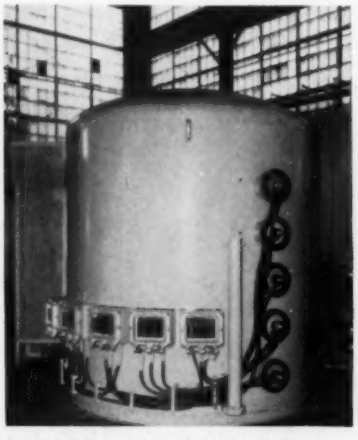
If you have a problem with thin strip, let Somers experience help you. Write for confidential data blank or field engineer.

FOR EXACTING STANDARDS ONLY
MONEL•NICKEL•COPPER•ALLOYS
THIN STRIP

Somers Brass Company, Inc.
WATERBURY, CONN.

Electric furnaces

These electric furnaces have been built to convert liquid titanium tetrachloride to sponge titanium by reduction with magnesium. Furnaces are pit type, rated 210 kw

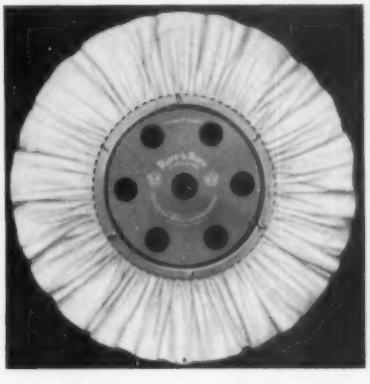


each, and are divided into three control zones. The reaction is exothermic and only a small amount of external heat is required. *Westinghouse Electric Corp.*

For more data circle No. 53 on postcard, p. 117

Buffing wheels

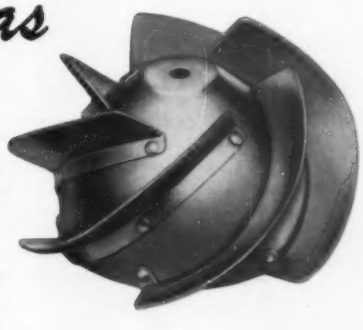
Use of steel centers on a line of buffs is described as making the metalfinishing wheels capable of dissipating frictional heat fast enough to keep the buff cool. The new center, composed of two steel disks, is mentioned as providing stronger support for the buffs



than the material formerly used. The buffs are available with 3, 5, 7 or 9 in. ID, with OD's as needed. *Hanson-Van Winkle-Munning Co.*

For more data circle No. 54 on postcard, p. 117

"Like two peas in a pod"



That's the description of two identical WSM stampings from two different runs, several years apart.

Dependable uniformity in these component parts is the result of skilled engineering design and accurate tools . . . plus over 70 years of precision stamping experience.

Why not give us the chance to prove we have the specific knowledge and complete equipment to turn out accurate stampings more advantageously than you can "do it yourself."

WORCESTER STAMPED METAL ©

Write for descriptive folder . . . or let our representative call in person . . . without obligation.

WORCESTER STAMPED METAL Company

10 HUNT ST., WORCESTER, MASS., U. S. A.

SPECIALISTS IN SKILLED STAMPING SERVICE

1941 ——— 1956

As TMI passes another important milestone in the precision service of American Industry, the successes of our yesteryears indicate new and even greater recognition for this familiar symbol:

The Mark of Quality TMI

Better Tubing is a Better Buy

We've built our reputation on this premise! TMI precision has cut machining and assembly costs on countless production lines, made many a pioneer engineer's dream come true. It has proven its worth with profit-minded management from coast to coast. And, the friendly TMI organization is well known for its ability to meet "almost impossible" delivery deadlines. TMI concentrates on quality rather than tonnage, better tubing that's a better buy—always!

Small Diameter Stainless Steel and Alloy Tubing for Top Flight Applications

We specialize in small diameters, .050" to .625" O.D., in tolerances as close as .001", in perfect finishes, inside and outside. And: in solving tubing problems! Your inquiries are always welcome and receive prompt attention.

TUBE METHODS INC. METALLURGISTS ENGINEERS • MANUFACTURERS

BRIDGEPORT (Montgomery County), Pa.

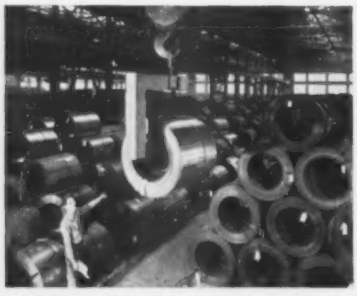
STEEL BUYERS GUIDE
to Ryerson Products and Services

You can draw on your nearby Ryerson plant for an almost endless number of products and services—and the more you concentrate your purchases at one source, the more you save. Ryerson products not pictured here include: Re-bars, expanded metal, grating, plastic pipe, machinery and tools, etc. See your Ryerson catalog for complete list and write for descriptive literature.

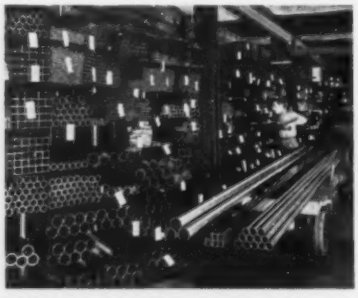
BARS—The most complete range of types, shapes and sizes as well as the largest tonnage.

STRUCTURALS — I-beams, H-beams, channels, angles, tees and zees—all to ASTM spec. A-7.

PLATES—14 types including special low carbon plates for forming and welding, leaded New E-Z-Cut, etc.



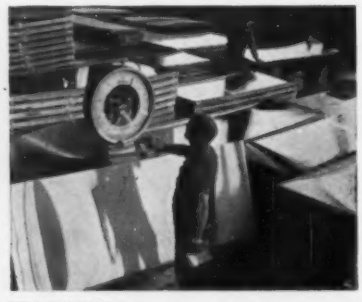
SHEETS & STRIP—More than 20 different types in pattern sizes, cut-to-order sizes, strip coils, etc.



TUBING—Seamless and welded mechanical tubing, fluid power tubing, structural and boiler tubes, etc.

C. F. BARS—Cold finished steel for every use: screw steel, Ledloy, accuracy stock, machinery steel, shafting, etc.

ALLOYS—Every type including leaded alloys for fastest machining, all performance-proved by tests.



STAINLESS—Allegheny stainless in over 2,221 sizes, shapes, types, finishes: sheets, plates, bars, pipe, etc.

FLAME CUTTING—Almost any shape quickly cut from strong rolled steel—one or hundreds all alike.

RYERSON STEEL

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE, N. C. • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

The Iron Age SUMMARY . . .

Steel mills beginning to worry about maintenance . . . Question of how long all-out pace can be maintained . . . Hubbub over steel prices and labor increasing market pressure.

Wear and Tear . . . The big question in the steel market is whether producers can maintain production at near-capacity levels. Wear and tear on melting furnaces and rolling mills is terrific. With incoming orders running 10 to 35 pct above capacity, maintenance is becoming a real problem. Scattered work stoppages over local grievances have hurt production. Producers also are pushing blast furnaces to the limit in an allout effort to restrain runaway scrap prices.

Meanwhile, the hubbub over prices and labor is raising the temperature of steel demand in an already-strong market. The scramble to build inventory is increasing the pressure brought about by a strong economy.

Setting the pace is nonresidential construction, just now getting into full swing with the coming of good weather. Premium prices for structurals and plate are common when they can be found. Importers are having a field day.

Inventory Buildup . . . The situation in automotive is typical of what is going on throughout the country in the way of inventory building. Although auto production has been cut back slightly, some carmakers are taking in all the steel they can get as a hedge against expected price advances and the uncertainty of steel labor negotiations which will get underway in the next month or so.

The most hopeful sign for steel customers may turn out to be the most frustrating: demand will ease slightly in July but the mills will be fighting heat, vacations, and repair cycles. Net result will be little or no dent in standing backlogs and heavy demand for additional material.

The shortage in nickel stainless steel is serious. Order volume from all sources, particularly defense, is picking up. Consumers without defense ratings have little chance to get everything they need. Step-up in the defense program will make the situation even tougher.

Demand Runs Deep . . . Mills are continually being surprised by the depth of demand from a cross-section of the economy. This applies to the so-called specialty steels—alloys and stainless—as well as the carbon steels sold in heavier tonnages. It looks like tinplate shipments will set another record this year.

Steel scrap prices are moving up again. Principal consuming areas report another upturn this week based on eagerness of mills to lay in a good inventory of material.

Steel Output, Operating Rates

Production	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	2,425	2,413	2,449	2,400
Ingot Index				
(1947-1949=100)	151.0	150.2	152.5	149.2
Operating Rates				
Chicago	100.0	99.0	100.5	98.5
Pittsburgh	102.0	101.0*	103.0	98.0
Philadelphia	100.0	101.0	104.0	96.0
Valley	98.0	99.0*	98.0	96.0
West	101.0	101.0*	101.5	93.5
Detroit	76.0	82.0*	101.0	93.0
Buffalo	105.0	105.0	105.0	105.0
Cleveland	101.0	102.0*	108.0	99.0
Birmingham	93.0	93.0	88.0	90.0
S. Ohio River	93.0	88.0*	91.0	94.0
Wheeling	101.0	102.0	100.0	94.0
St. Louis	100.0	95.0	101.0	90.0
Northeast	92.0	92.0*	89.0	79.5
Aggregate	98.5	98.0	99.5	95.5

*Revised

Prices At A Glance

(cents per lb unless otherwise noted)	This Week	Week Ago	Month Ago	Year Ago
Composite price				
Finished Steel, base	5.179	5.179*	5.179*	4.797
Pig Iron (Gross Ton)	$60.29	$59.71	$59.09	$56.59
Scrap, No. 1 hvy (gross ton)	$54.83	$53.67	$48.83	$37.33
Nonferrous				
Aluminum ingot	25.90	25.90	24.40	23.20
Copper, electrolytic	46.00	46.00	46.00	36.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Magnesium	33.25	33.25	33.25	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	99.50	99.00	102.00	91.375
Zinc, E. St. Louis	13.50	13.50	13.50	12.00

Higher Price Demand Mounts

Republic Steel President cites need for higher steel prices . . . Joins other steel heads in pointing up high cost of expansion . . . Plates, structurals are tightest items.

◆ THE PRESSURE for higher steel prices is growing. Another producer has come out publicly for higher prices to help finance what he calls a $1 billion-a-year expansion program over the next 15 years.

Following on the heels of E. T. Weir's statement several weeks ago, Charles M. White, president of Republic Steel Corp., says price rises are necessary to improve earnings and encourage private investment to justify "huge" borrowing.

Mr. White points out that steel makers have already laid plans for a 15-million-ton increase in capacity during the next three years.

Pointing up some of the underlying factors making future large-scale steel expansion essential, Mr. White cites the nation's astounding population growth backed up by the high degree of business confidence which now prevails.

To attract capital from outside sources, he adds, the steel industry must get its cost and selling price ratios in a position to match those of many other industries.

Tennessee Coal & Iron Div. of U. S. Steel Corp. has increased the base price of track spikes 15¢ to $8.05 per 100 lb. But net cost to consumers remains the same since a former 15¢ extra becomes part of the base price. Republic Steel had moved earlier.

PLATES AND STRUCTURALS . . . Both products continue tight in all market areas. Despite importation of foreign plate in the **Chicago** area, local mills are still rolling conversion plate and will continue to do so through June. Standard plate mills in the area are booked solid for the rest of the year, while other producers are attempting to fill consumer demands by rolling some plate on strip mills. Shipment of structural products from eastern sources is on the increase and there's also a reported pickup in the trickle of foreign shapes into the area. Demand for both products is so heavy in **Cleveland** that some eastern brokers are said to be offering Japanese plate there at $178 per ton delivered. In addition, some Cleveland deliveries have been pushed back by a strike in a Pennsylvania mill soaking pit which cost about 40,000 tons and pushes April deliveries into May. Similar reports of tightness in both plate and structurals come from the **West Coast** where many producers point out that the more they produce, the more it seems the customers want. One mill man predicts, "that's the way it's going to be for a lot of months to come."

SHEETS AND STRIPS . . . Word from **Cleveland** is that some additional pressure is being felt from **Detroit** for cold-rolled sheet inventory building. However, considerable tonnage for May and June, cancelled out by auto producers, is booked for appliance makers and others. Mills in the **Chicago** area report some easing in customer demand for cold-rolled sheets, though they admit they still have carryovers of one to four weeks on this product. It's generally expected this easing will continue, although producers maintain they expect capacity production on their cold-rolled sheet mills through the second quarter. Hot-rolled sheet in **Chicago** is substantially tighter, though most mills say delivery carryovers are running no more than 3 to 4 weeks behind.

BARS . . . Demand is still running high in virtually every market area. Earlier optimism in some areas based on a feeling of easing in cold-finished bar shipments isn't borne out in **Chicago.** CF bar delivery backlogs of up to 8 weeks are still reported there by some consumers. Likewise, several weeks' carryovers of hot-rolled bar persist at some mills in the area and tonnages shipped are still reportedly very high.

WIRE . . . Merchant wire demand in both the **Cleveland** and **Chicago** markets is off somewhat with farmers and other large consumers buying only what they need at the moment. Generally, jobber stocks of merchant wire are strong right now, with some cutbacks reported in areas where jobbers had booked heavily in anticipation of high consumer demand. Conversely, consumer pressure for manufacturers wire continues strong in all market areas.

WAREHOUSES . . . There's a note of optimism on continued high sales activity among **Chicago** warehousemen. Larger warehouses report March selling above that of February with the pace still holding for early April. So far, volume is well above the 1955 first quarter, and warehouses expect good levels to hold for at least the next 30 to 60 days. Depleted inventories, it's felt, probably won't be corrected until late June or early July on such tight products as sheets, plate, structurals and some grades of bar stock.

IRON ORE . . . The race to start the Great Lakes iron ore shipping season got underway last week with a Canadian grain boat winning the event by 3 hours in being first through the Soo locks. Three hours later, Inland Steel's 21,000-ton capacity Sykes passed through headed for the ore docks. All Great Lakes freighters will carry only about 80 to 85 pct of maximum load under winter loading limits until May 1 to improve maneuverability in case of heavy weather.

Purchasing Agent's Checklist

TACONITE: Investments in low grade ore bring new life to Mesabi range . . . . . p. 59

MACHINE TOOLS: How to analyze tooling needs . . . . . p. 83

STEEL: Summer won't bring much market letup . . . . . p. 155

Comparison of Prices

(Effective April 10, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Apr. 10 1956	Apr. 3 1956	Mar. 15 1956	Apr. 12 1955
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	4.325¢	4.325¢	4.325¢	4.05¢
Cold-rolled sheets	5.325	5.325	5.325	4.95
Galvanized sheets (10 ga.)	5.85	5.85	5.85	5.45
Hot-rolled strip	4.325	4.325	4.325	4.05
Cold-rolled strip	6.28	6.29	6.29	5.79
Plate	4.52	4.52	4.52	4.225
Plates, wrought iron	10.40	10.40	10.40	9.30
Stainl's C-R strip (No. 302)	44.50	44.50	44.50	42.00
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$9.05	$9.05	$9.05	$9.05
Tinplate, electro (0.50 lb.)	7.75	7.75	7.75	7.75
Special coated mfg. ternes	7.85	7.85	7.85	7.85
Bars and Shapes: (per pound)				
Merchant bars	4.65¢	4.65¢	4.65¢	4.30¢
Cold finished bars	5.90	5.90	5.90	5.40
Alloy bars	5.65	5.65	5.65	5.075
Structural shapes	4.60	4.60	4.60	4.25
Stainless bars (No. 302)	38.25	38.25	38.25	35.50
Wrought iron bars	11.50	11.50	11.50	10.40
Wire: (per pound)				
Bright wire	6.60¢	6.60¢*	6.60¢*	5.75¢
Rails: (per 100 lb.)				
Heavy rails	$4.725	$4.725	$4.725	$4.45
Light rails	5.65	5.65	5.65	5.35
Semifinish Steel: (per net ton)				
Rerolling billets	$68.50	$68.50	$68.50	$64.00
Slabs, rerolling	68.50	68.50	68.50	64.00
Forging billets	84.50	84.50	84.50	78.00
Alloy blooms, billets, slabs	96.00	96.00	96.00	86.00
Wire Rod and Skelp: (per pound)				
Wire rods	5.025¢	5.025¢	5.025¢	4.675¢
Skelp	4.225	4.225	4.225	3.90
Finished Steel Composite: (per pound)				
Base price	5.179¢	5.179¢*	5.179¢*	4.797¢

	Apr. 10 1956	Apr. 3 1956	Mar. 15 1956	Apr. 12 1955
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$65.26	$64.26	$63.69	$61.19
Foundry, Valley	60.50	60.50	59.00	56.50
Foundry, Southern Cin'ti	62.93	62.93	62.93	60.43
Foundry, Birmingham	55.00	55.00	55.00	52.88
Foundry, Chicago	60.50	59.00	59.00	56.50
Basic, del'd Philadelphia	64.48	63.73	62.77	60.27
Basic, Valley furnace	60.00	60.00	58.50	56.00
Malleable, Chicago	60.50	59.00	59.00	56.50
Malleable, Valley	60.50**	60.50	59.00	56.50
Ferromanganese‡, cents per lb.	9.50¢	9.50¢	9.50¢	9.50¢
‡ 74.76 pct Mn base.				
Pig Iron Composite: (per gross ton)				
Pig iron	$60.29	$59.71	$59.09	$56.59
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$55.50	$53.50	$49.50	$38.50
No. 1 steel, Phila. area	54.50	53.00	49.50	37.00
No. 1 steel, Chicago	54.50	51.00	47.50	36.50
No. 1 bundles, Detroit	55.50	46.50	44.50	29.00
Low phos., Youngstown	61.50	59.50	54.50	39.50
No. 1 mach'y cast, Pittsburgh	58.50	57.50	55.50	43.50
No. 1 mach'y cast, Philadel'a	55.50	55.50	54.50	44.50
No. 1 mach'y cast, Chicago	57.50	55.50	52.50	48.00
Steel Scrap Composite: (per gross ton)				
No. 1 heavy melting scrap	$54.83	$53.67	$48.83	$37.33
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.50	$14.25	$14.25	$13.00
Foundry coke, prompt	17.50	16.25	16.25	16.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$46.00	$46.00	$46.00	$36.00
Copper, Lake, Conn.	46.00	46.00	46.00	36.00
Tin, Straits, New York	99.50†	99.00	102.00	91.375
Zinc, East St. Louis	13.50	13.50	13.50	12.00
Lead, St. Louis	15.80	15.80	15.80	14.80
Aluminum, virgin ingot	25.90	25.90	24.40	23.20
Nickel, electrolytic	64.50	64.50	64.50	67.67
Magnesium, ingot	33.25	33.25	33.25	29.25
Antimony, Laredo, Tex.	33.00	33.00	33.00	28.50

† Tentative. ‡ Average. * Revised. ** Correct March 27 price $59.75.

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

←To Identify producers, see Key on P. 168→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem *B3*	62.00	62.50	63.00	63.50	.....
Birdsboro, Pa. *B6*	62.00	62.50	63.00	63.50	.....
Birmingham *R3*	54.50	55.00*	.....	.....	.....
Birmingham *W9*	54.50	55.00*	59.00	.....	.....
Birmingham *U4*	54.50	55.00*	59.00	.....	.....
Buffalo *R3*	60.00	60.50	61.00	61.50	.....
Buffalo *H1*	60.00	60.50	61.00	.....	.....
Buffalo *W6*	60.00	60.50	61.00	61.50	.....
Chester *C17*	62.00	62.50	63.00	.....	.....
Chicago *I4*	60.00	60.50	60.50	61.00	.....
Cleveland *A5*	60.00	60.50	60.50	61.00	65.00†
Cleveland *R3*	60.00	60.50	60.50	61.00	.....
Duluth *I4*	60.00	60.50	60.50	61.00	65.00
Erie *I4*	60.00	60.50	60.50	61.00	65.00
Everett *M6*	.....	62.50	63.00	.....	.....
Fontana *K1*	67.50	68.00	.....	.....	.....
Geneva, Utah *C7*	60.00	60.50	.....	.....	.....
Granite City *G2*	61.90	62.40	62.90	.....	.....
Hubbard *Y1*	.....	.....	60.50	.....	.....
Lone Star *L3*	.....	55.00	.....	.....	.....
Midland *C11*	58.50	.....	.....	.....	.....
Minnequa *C6*	62.00	62.50	63.00	.....	.....
Monessen *P6*	58.50	.....	.....	.....	.....
Neville Is. *P4*	60.00	60.50	60.50	61.00	65.00†
N. Tonawanda *T1*	.....	60.50	61.00	61.50	.....
Pittsburgh *U1*	60.00	.....	60.50	61.00	.....
Sharpsville *S3*	60.00	60.50	60.50	61.00	.....
So. Chicago *R3*	60.00	.....	60.50	.....	.....
Steelton *B3*	62.00	62.50	63.00	63.50	68.00
Swedeland *A2*	62.00	62.50	63.00	63.50	.....
Toledo *I4*	60.00	60.50	60.50	61.00	.....
Troy, N. Y. *R3*	62.00	62.50	63.00	63.50	68.00
Youngstown *Y1*	.....	.....	60.50	61.00	.....

DIFFERENTIALS: Add, 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional, 0.25 pct nickel. * Add $1.00 for 0.31-0.69 pct phos. † Intermediate low phos.

Silvery Iron Buffalo, *H1*, $68.75; Jackson, *J1*, *G1*, $67.50. Add $1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

STAINLESS STEEL

Base price cents per lb. f.o.b. mill.

Product	301	302	303	304	316	321	348	410	416	430
Ingots, rerolling	17.75	19.00	—	20.25	31.50	25.00	33.75	15.00	—	15.25
Slabs, billets, rerolling	22.25	24.75	26.75	26.00	40.25	32.00	43.00	19.50	—	19.75
Forg. discs, die blocks, rings	—	—	—	—	—	—	—	—	—	—
Billets, forging	31.75	32.00	34.75	33.75	51.25	39.25	51.00	25.50	26.00	26.00
Bars, wires, structurals	38.00	38.25	41.00	40.25	60.75	45.25	60.00	30.50	31.00	31.00
Plates	40.00	40.25	42.75	43.00	64.00	49.25	64.75	31.75	32.25	32.25
Sheets	44.25	44.50	52.25	47.25	68.25	54.25	73.50	36.25	—	36.75
Strip, hot-rolled	32.00	34.50	—	37.25	58.25	44.25	50.75	—	—	—
Strip, cold-rolled	41.00	44.50	—	47.25	68.25	54.25	73.50	36.25	—	36.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11*; Brackenridge, Pa., *A3*; Butler, Pa., *A7*; McKeesport, Pa., *U1*; Washington, Pa., *W2*, (2.25¢ lower on Type 430) *J2*; Baltimore, *E1*; Middletown, O., *A7*; Massillon, O., *R3*; Gary, *U1*; Bridgeville, Pa., *U2*; New Castle, Ind., *I2*; Ft. Wayne, *J4*; Philadelphia, *D5*.

Strip: Midland, Pa., *C11*; Cleveland, *A5*; Carnegie, Pa., *S9*; McKeesport, Pa., *F1*; Reading, Pa., *C2*; Washington, Pa., *W2*; W. Leechburg, Pa., *A3*; Bridgeville, Pa., *U2*; Detroit, *M2*; Canton-Massillon, O., *R3*; Middletown, O., *A7*; Harrison, N. J., *D3*; Youngstown, *C5*; Sharon, Pa., *S1*; Butler, Pa., *A7*; Wallingford, Conn., *U3* (.25¢ per lb higher); *W1* (.25¢ per lb higher); New Bedford, Mass., *R6*.

Bar: Baltimore, *A7*; Duquesne, Pa., *U1*; Munhall, Pa., *U1*; Reading, Pa., *C2*; Titusville, Pa., *U2*; Washington, Pa., *J2*; McKeesport, Pa., *U1*, *F1*; Bridgeville, Pa., *U2*; Dunkirk, N. Y., *A3*; Massillon, O., *R3*; Chicago, *U1*; Syracuse, N. Y., *C11*; Watervliet, N. Y., *A3*; Waukegan, *A5*; Canton, O., *T5*; Ft. Wayne, *I4*; Philadelphia, *D5*; Detroit, *R5*.

Wire: Waukegan, *A5*; Massillon, O., *R3*; McKeesport, Pa., *F1*; Ft. Wayne, *J4*; Harrison, N. J., *D3*; Baltimore, *A7*; Dunkirk, *A3*; Monessen, *P1*; Syracuse, *C11*; Bridgeville, *U2*.

Structurals: Baltimore, *A7*; Massillon, O., *R3*; Chicago, Ill., *J4*; Watervliet, N. Y., *A3*; Syracuse, *C11*.

Plates: Brackenridge, Pa., *A3*; Chicago, *U1*; Munhall, Pa., *U1*; Midland, Pa., *C11*; New Castle, Ind., *I2*; Middletown, *A7*; Washington, Pa., *J2*; Cleveland, Massillon, *R3*; Coatesville, Pa., *C15*; Philadelphia, *D5*.

Forged discs, die blocks, rings: Pittsburgh, *C11*; Syracuse, *C11*; Ferndale, Mich., *A3*; Washington, Pa., *J2*.

Forgings billets: Midland, Pa., *C11*; Baltimore, *A7*; Washington, Pa., *J2*; McKeesport, *F1*; Massillon, Canton, O., *R3* Watervliet, *A3*; Pittsburgh, Chicago, *U1*; Syracuse, *C11*; Detroit, *R5*.

Composite Sets New Record

General strength characterizes most markets . . . Buyers wonder when peak will be reached . . . Mill attempts to hold price in check fail . . . Detroit sets price pace.

◆ THE SCRAP market built up a full head of steam this week, as soaring prices pushed THE IRON AGE composite to a new all-time high of $54.83, up $1.16 per ton over last week, which equaled the previous record established in January.

There was some speculation that the latest boom was about to level off, but the pressure was still there despite efforts of consumers to halt the upturn. Some mills were staying out of the market or buying only less desirable material, gambling that prices will turn down later.

But the significant aspect of the market is that the higher prices developed at a time when integrated mills were running their blast furnaces for all they're worth, and using a high percentage of hot metal to keep scrap in check. Apparently, this maneuver has been offset by high scrap consumption by the electric furnace shops, which generally use an all-scrap charge.

Biggest price jump was in Detroit, where No. 1 heavy melting moved up $3 per ton on broker bidding. Mills there were bidding up No. 2 heavy melting to bring out better grades of this material and at the same time reduce the pressure on the top grade.

Chicago advanced $2 per ton, and Philadelphia moved up $1.50. Pittsburgh held unchanged although higher prices in adjacent areas were making its position almost untenable. Valley price rose $2 on basis of the latest purchase, and New York also advanced $2.

Pittsburgh . . . Prices of steelmaking grades held unchanged here this week although continued strength in nearby districts was making an "island" of the area. Consumers were fighting a rear-guard action, settling for less desirable material and generally holding off on purchases in hope the storm will blow over. Good scrap is practically non-existent. On the basis of latest lists, railroad grades moved up. Low phos also advanced.

Chicago . . . With some scrap men showing alarm at the still rising market, and despite mill offers to buy at lower prices, Chicago prices again rose another $2 to $3 along the line, with factory bundles and premium grades showing greatest strength. Repeated attempts to hold the market by buying at existing prices failed and even mill purchases at higher prices did not bring heavy tonnages.

Philadelphia . . . The market here continues strong and active. On the basis of latest broker and dealer buying, steelmaking grades reflect new advances along with firmer price tones in blast furnace grades and railroad specialties. Dealers report yard intake and outgo brisk together with some pickup in export.

New York . . . Continued orders from mills in the adjacent consuming district have again boosted scrap prices here. No. 1 heavy melting is now moving at a top of $50 per gross ton, and brokers say they are having trouble getting material at that price. No. 2 steel is unchanged at $41, but No. 2 bundles have risen to a top of $40. Turnings are up $3 to $5 and cast has increased $1.

Detroit . . . Broker buying prices advanced another $3 this week for No. 1 grades. Surprising activity occurred with No. 2 heavy melting, with prices pushed closer to No. 1 grades, but accompanied by a depressing of No. 2 bundles. Strict inspection is being enforced, requiring a top quality of No. 2 heavy melting to get offered prices.

Cleveland . . . Valley price moved up $2 on sale of moderate tonnage of dealer material from restricted yards, restoring differential with Cleveland. A Cleveland mill also bought within quoted price range and the market quieted down. Because of weak market for blast furnace grades in the Valley, some is coming into Cleveland on special orders.

Birmingham . . . The largest consumer of open hearth scrap in the district, which had been holding up shipments, accepted limited quantities this week, and another that released shipments last week was in the market for limited supplies, paying $40 per ton delivered for No. 2 heavy melting.

St. Louis . . . Only change in price structure here is in cupola cast, which is $1 higher, as foundries are actively in the market with increased business. All items are strong. Recent advances along the line caused shipments to increase, and they are now equal to demand.

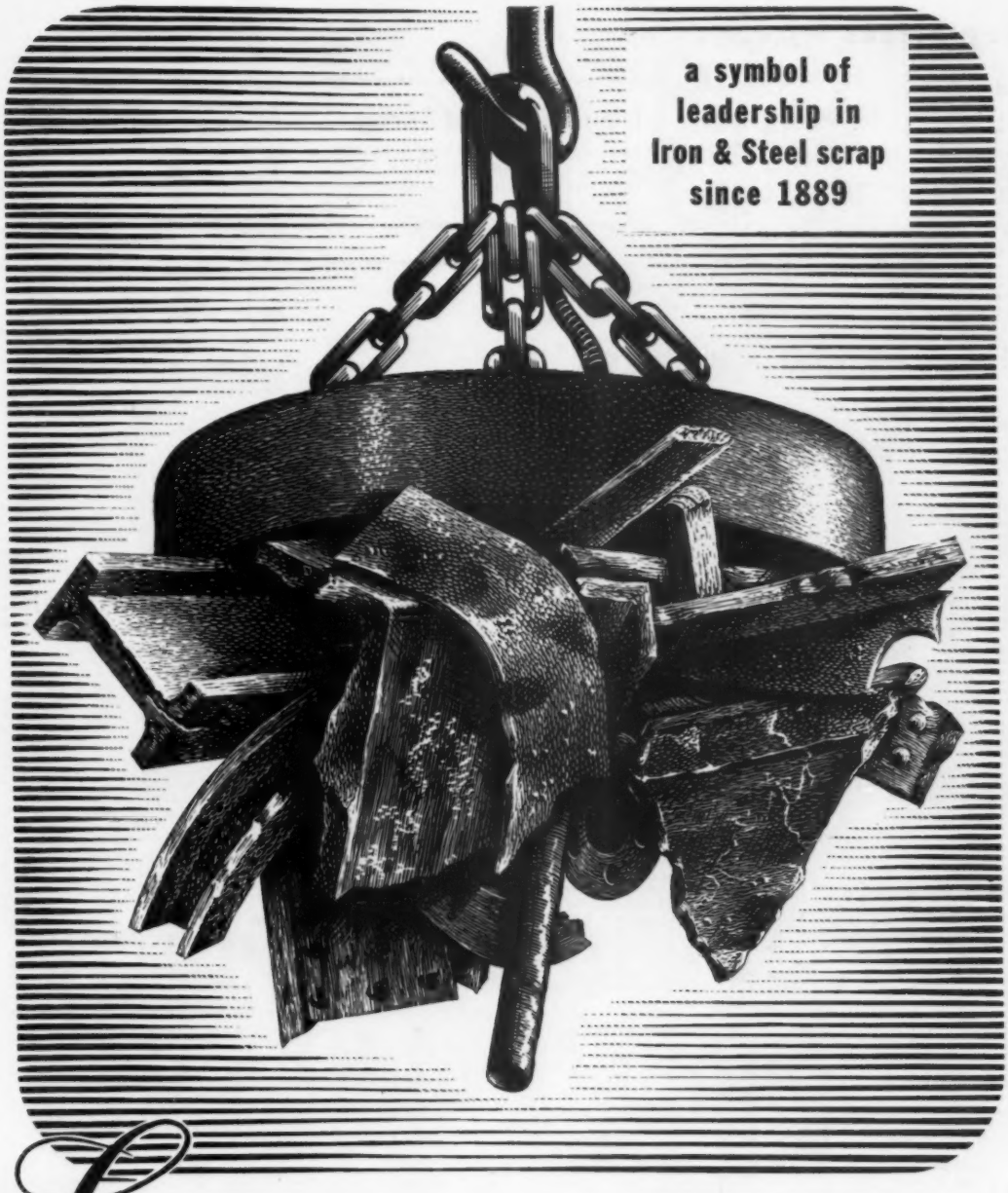
Cincinnati . . . Market remained quiet except for high prices on railroad lists, with some tonnage coming into area as high as $73.50 for 3-ft rails. Local good prices are offsetting lure of Pittsburgh-by-barge, although some is going on special deals.

Buffalo . . . The market continues strong and small sales of No. 2 heavy melting and No. 2 bundles were made at slightly higher prices, but sales were not enough to affect prices generally. Some leveling off of the market is expected.

Boston . . . Prices moved up $1 for most grades, the market registering general gains for the fourth consecutive week. Most No. 1 grades are going to the Ohio area while Buffalo and eastern Pennsylvania mills are taking secondary grades. Export has picked up slightly.

West Coast . . . Prices are holding firm in all major market areas. Mills are sitting on top of heavy inventories. However, exporting tempo continues to pick up, making mills somewhat apprehensive.

Hamilton, Ont. . . . Prices in the Hamilton market were inadvertently increased in issues of March 27 and April 3. Actually, prices should not have changed until this week, based on a mill purchase on April 6.



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EXPORTS-IMPORTS LIVINGSTON & SOUTHARD, INC. 99 Park Ave., New York, N. Y. *Cable Address:* **FORENTRACO**

Scrap Prices *(Effective April 10, 1956)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	55.00 to 56.00
No. 2 bundles	45.00 to 46.00
Machine shop turn.	37.00 to 38.00
Mixed bor. and ms. turn.	37.00 to 38.00
Shoveling turnings	41.00 to 42.00
Cast iron borings	41.00 to 42.00
Low phos. punch'gs plate	63.00 to 64.00
Heavy turnings	52.00 to 53.00
No. 1 RR hvy. melting	63.00 to 64.00
Scrap rails, random lgth.	68.00 to 69.00
Rails 2 ft and under	73.00 to 74.00
RR. steel wheels	68.00 to 69.00
RR. spring steel	68.00 to 69.00
RR. couplers and knuckles	68.00 to 69.00
No. 1 machinery cast	58.00 to 59.00
Cupola cast	52.00 to 53.00
Heavy breakable cast	49.00 to 50.00

Chicago

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 factory bundles	60.00 to 61.00
No. 1 dealers' bundles	55.00 to 56.00
No. 2 dealers' bundles	42.00 to 43.00
Machine shop turn	32.00 to 33.00
Mixed bor. and turn	34.00 to 35.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	34.00 to 35.00
Low phos. forge crops	63.00 to 64.00
Low phos. punch'gs plate	59.00 to 61.00
Low phos. 3 ft and under	58.00 to 59.00
No. 1 RR. hvy. melting	59.00 to 60.00
Scrap rails, random lgth	66.00 to 67.00
Rerolling rails	73.00 to 75.00
Rails 2 ft and under	73.00 to 74.00
Locomotive tires, cut	64.00 to 65.00
Cut bolsters & side frames	64.00 to 65.00
Angles and splice bars	70.00 to 71.00
RR. steel car axles	70.00 to 71.00
RR. couplers and knuckles	63.00 to 64.00
No. 1 machinery cast	57.00 to 58.00
Cupola cast	53.00 to 54.00
Heavy breakable cast	45.00 to 46.00
Cast iron brake shoes	44.00 to 45.00
Cast iron car wheels	52.00 to 53.00
Malleable	65.00 to 66.00
Stove plate	46.00 to 47.00
Steel car wheels	65.00 to 66.00

Philadelphia Area

No. 1 hvy. melting	$54.00 to $55.00
No. 2 hvy. melting	45.50 to 46.50
No. 1 bundles	54.00 to 55.00
No. 2 bundles	43.50 to 44.50
Machine shop turn	36.50 to 37.50
Mixed bor. short turn	36.50 to 37.50
Cast iron borings	40.00 to 41.00
Shoveling turnings	40.00 to 41.00
Clean cast chem. borings	46.50 to 47.50
Low phos. 5 ft and under	57.00 to 58.00
Low phos. 2 ft and under	58.00 to 59.00
Low phos. punch'gs	58.00 to 59.00
Elec. furnace bundles	56.00 to 57.00
Heavy turnings	50.00 to 51.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
Rails 18 in. and under	67.00 to 68.00
Cupola cast	50.00 to 51.00
Heavy breakable cast	53.00 to 54.00
Cast iron car wheels	56.00 to 57.00
Malleable	67.50 to 68.50
Unstripped motor blocks	38.00 to 39.00
No. 1 machinery cast	55.00 to 56.00

Cleveland

No. 1 hvy. melting	$57.00 to $58.00
No. 2 hvy. melting	50.00 to 51.00
No. 1 bundles	57.00 to 58.00
No. 2 bundles	44.00 to 45.00
No. 1 busheling	57.00 to 58.00
Machine shop turn.	31.00 to 32.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	35.00 to 36.00
Cast iron borings	35.00 to 36.00
Cut struct'r'l & plates, 2 ft & under	62.00 to 63.00
Drop forge flashings	57.00 to 58.00
Low phos. punch'gs, plate	58.00 to 59.00
Foundry steel, 2 ft & under	60.00 to 61.00
No. 1 RR. heavy melting	59.00 to 60.00
Rails 2 ft and under	73.00 to 74.00
Rails 18 in. and under	74.00 to 75.00
Railroad grate bars	43.00 to 44.00
Steel axle turnings	39.00 to 40.00
Railroad cast	59.00 to 60.00
No. 1 machinery cast	58.00 to 59.00
Stove plate	54.00 to 55.00
Malleable	61.00 to 62.00

Youngstown

No. 1 hvy. melting	$60.00 to $61.00
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	60.00 to 61.00
No. 2 bundles	43.00 to 44.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	36.00 to 37.00
Low phos. plate	61.00 to 62.00

Buffalo

No. 1 hvy. melting	$51.00 to $52.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 busheling	51.00 to 52.00
No. 1 bundles	51.00 to 52.00
No. 2 bundles	35.00 to 36.00
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	30.00 to 31.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	31.00 to 32.00
Low phos. plate	55.00 to 56.00
Scrap rails, random lgth.	55.00 to 56.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	55.00 to 56.00
RR. spring steel	55.00 to 56.00
RR. couplers and knuckles	55.00 to 56.00
No. 1 machinery cast	52.00 to 53.00
No. 1 cupola cast	49.00 to 50.00

Detroit

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$55.00 to $56.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 bundles, openhearth	55.00 to 56.00
No. 2 bundles	38.00 to 39.00
New busheling	55.00 to 56.00
Drop forge flashings	54.50 to 55.50
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	27.00 to 28.00
Cast iron borings	27.00 to 28.00
Low phos. punch'gs, plate	55.00 to 56.00
No. 1 cupola cast	46.00 to 47.00
Heavy breakable cast	39.00 to 40.00
Stove plate	40.00 to 41.00
Automotive cast	50.00 to 51.00

St. Louis

No. 1 hvy. melting	$45.00 to $46.00
No. 2 hvy. melting	42.50 to 43.50
No. 1 bundles	47.00 to 48.00
No. 2 bundles	38.50 to 39.50
Machine shop turn.	29.50 to 30.50
Cast iron borings	31.50 to 32.50
Shoveling turnings	31.50 to 32.50
No. 1 RR. hvy. melting	55.00 to 56.00
Rails, random lengths	58.50 to 59.50
Rails 18 in. and under	65.00 to 66.00
Locomotive tires uncut	55.00 to 56.00
Angles and splice bars	58.00 to 59.00
Std. steel car axles	61.00 to 62.00
RR. specialties	58.00 to 59.00
Cupola cast	51.00 to 52.00
Heavy breakable cast	43.00 to 44.00
Cast iron brake shoes	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	57.00 to 58.00
Rerolling rails	73.00 to 74.00
Malleable	50.00 to 51.00
Unstripped motor blocks	43.00 to 44.00

Boston

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$46.00 to $47.00
No. 2 hvy. melting	35.00 to 36.00
No. 1 bundles	46.00 to 47.00
No. 2 bundles	33.00 to 34.00
No. 1 busheling	46.00 to 47.00
Elec. furnace, 3 ft & under	47.50 to 48.50
Machine shop turn.	27.50 to 28.50
Mixed bor. and short turn.	28.00 to 29.00
Shoveling turnings	30.50 to 31.50
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	45.50 to 46.00
Mixed cupola cast	41.00 to 42.00
Heavy breakable cast	42.50 to 43.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	26.50 to 27.00

New York

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$49.00 to $50.00
No. 2 hvy. melting	40.00 to 41.00
No. 2 bundles	39.00 to 40.00
Machine shop turn.	27.00 to 28.00
Mixed bor. and turn.	27.00 to 28.00
Shoveling turnings	31.00 to 32.00
Clean cast chem. borings	32.00 to 33.00
No. 1 machinery cast	48.00 to 49.00
Mixed yard cast	45.00 to 46.00
Charging box cast	45.00 to 46.00
Heavy breakable cast	45.00 to 46.00
Unstripped motor blocks	30.00 to 31.00

Birmingham

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 bundles	36.00 to 37.00
No. 2 bundles	29.00 to 30.00
No. 1 busheling	36.00 to 37.00
Machine shop turn.	31.00 to 32.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	21.50 to 22.50
Electric furnace bundles	44.00 to 45.00
Structural and plate, 2 ft	49.00 to 50.00
Structural and plate, 2 ft	50.00 to 51.00
No. 1 RR. hvy. melting	49.00 to 50.00
Scrap rails, random lgth.	60.00 to 61.00
Rails, 18 in. and under	62.00 to 63.00
Angles & splice bars	58.00 to 59.00
Rerolling rails	63.00 to 64.00
No. 1 cupola cast	47.50 to 48.50
Stove plate	46.00 to 47.00
Charging box cast	32.00 to 33.00
Cast iron car wheels	39.00 to 40.00
Unstripped motor blocks	37.00 to 38.00
Mashed tin cans	15.00 to 16.00

Cincinnati

Brokers buying prices per gross ton, on cars:

No. 1 hvy. melting	$53.00 to $54.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	53.00 to 54.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	35.00 to 36.00
Shoveling turnings	36.00 to 37.00
Cast iron borings	34.00 to 35.00
Low phos. 18 in. & under	59.00 to 60.00
Rails, random lengths	63.00 to 64.00
Rails, 18 in. and under	71.00 to 72.00
No. 1 cupola cast	50.00 to 51.00
Hvy. breakable cast	47.00 to 48.00
Drop broken cast	59.00 to 60.00

San Francisco

No. 1 hvy. melting	$36.00
No. 2 hvy. melting	30.00
No. 1 bundles	35.00
No. 2 bundles	26.00
No. 3 bundles	20.00
Machine shop turn.	18.00
Cast iron borings	20.00
No. 1 RR. hvy. melting	45.00
No. 1 cupola cast	43.00

Los Angeles

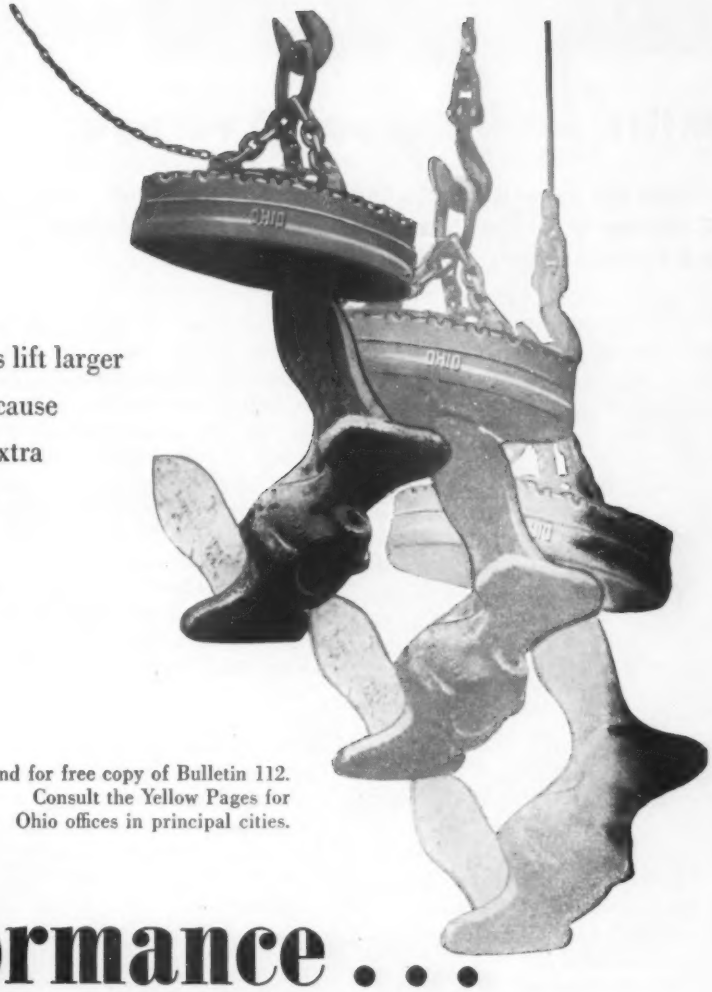
No. 1 hvy. melting	$38.00
No. 2 hvy. melting	32.00
No. 1 bundles	37.00
No. 2 bundles	28.00
No. 3 bundles	22.00
Machine shop turn.	18.00
Shoveling turnings	21.00
Cast iron borings	18.00
Elec. furn. 1 ft and under	38.00
No. 1 RR. hvy. melting	38.00
No. 1 cupola cast	44.00

Seattle

No. 1 hvy. melting	$38.00
No. 2 hvy. melting	35.00
No. 2 bundles	26.00
No. 3 bundles	20.00
No. 1 cupola cast	45.00
Mixed yard cast	45.00

Hamilton, Ont.

No. 1 hvy. melting	$50.50
No. 2 hvy. melting	46.50
No. 1 bundles	50.50
No. 2 bundles	42.00
Mixed steel scrap	44.50
Bushelings	40.50
Bush., new fact., prep'd	48.50
Bush., new fact., unprep'd	44.50
Machine shop turn.	23.00
Short steel turn.	27.50
Mixed bor. and turn.	24.00
Rails, rerolling	58.50
Cast scrap	50.00



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Ohio Bolted Magnets 12″ to 65″ diameter. 6-coil types in 39″ to 65″; 8-coil in 55″ and 65″. Strap copper coils over 39″. Bolts protected in recessed wells. Also capsule coil over 45″.

Ohio Welded Magnets 39″ to 65″ diameter. Lightweight models in 39″ and 45″. 6-coil types in 46″, 55″, 65″; 8-coil in 55″ and 65″. Welded on top where it can't get dented in. Also capsule coil over 45″.

Ohio Basket Magnets 55″ and 65″ 4-coil, and 65″ 6-coil. For extra heavy-duty service; hefty ears project beyond magnet diameter, ward off damaging blows. No weight carried by bolts. Also capsule coil over 45″.

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Shell and Torque Motors,
Precision Threaded Parts for
Aircraft Engine Manufacturers.

THE OHIO ELECTRIC MFG. CO.
5400 Dunham Rd., Maple Heights • Cleveland, Ohio

Ohio ELECTRIC

Chester Bland
President

Mills Give Copper Average

Copper mill prices down . . . Based on copper price of 47.50¢ per lb . . . Considered average of domestic, Chilean and custom smelters . . . Possible world price.

◆ ALL LEADING copper, brass and bronze mills have reduced their prices. New figures are based on 47.50¢ copper. Previous prices had been on the basis of 49.00¢ copper.

This is probably the best indication the industry has had in recent weeks of the actual current average copper price. Consumers possibly may have to pay a slightly different price for every shipment of copper they receive.

Domestically produced copper is 46¢ per lb.

Braden Copper (Kennecott Chile) price is the average of the mean between bid and asked on the official session of the London Metals Exchange for the week during which copper is shipped.

Chile Copper (Anaconda Chile) price is average of the mean between bid and asked on official session of LME for week previous to shipment. Both prices currently are fluctuating between 48 and 50¢.

Custom smelters are charging about 50¢ per lb.

Since the mills charge a price for their products in line with the price they must pay for copper, the present circumstances force these operations to estimate the average price of copper from all normal sources.

The results, 47.50¢ per lb, indicates two things. Initially, since this is closer to the U. S. producers' price than to custom smelters or Chilean copper, mills are still depending to a great extent on this source despite mutterings to the contrary. And secondly, if the aim of the copper producers in using the new, radical method of pricing Chilean copper, weekly average of LME, is to be realized, then the LME must loosen up and drop down to this level while the domestic producers must push their prices up 1½¢.

In other words, barring any major change in copper market conditions, the success of the attempt to promote a world price for copper will stand or fall on the ability of the various participants to adjust to this new mill price base.

ALUMINUM . . . The industry goes rolling merrily along with expansion and increased production as the order of the day. Most recent is the announcement by Aluminum Co. of America that it will spend $45 million to build a new alumina plant adjacent to its primary aluminum smelter at Point Comfort, Tex.

New plant is expected to produce about 500,000 tons of alumina annually, enough to supply the Rockdale operation, in addition to Point Comfort smelter. Initial production is scheduled for early 1958.

In conjunction with the project Alcoa has also announced its intention of constructing an ore-unloading dock at a cost of about $3 million. A proposed navigation channel from the Gulf of Mexico to the plant site will make the dock necessary.

The company may well have need of this additional capacity if the current trend continues. Indications are that in March the four producers turned out about 284 million lb of primary aluminum. The all-time record has been 282 million lb produced in December 1955. And they are selling every lb they turn out.

ZINC . . . The market tightened up considerably in March after showing signs of weakness in the previous month. Total production was 91,690 tons, up 5,000 tons from the previous month. However, unfilled orders at the end of the period were up from 45,255 tons at the end of February to 53,070 tons.

TIN . . . President Eisenhower has indicated that he agrees with ODM chief Flemming that the Texas City smelter should be sold to private enterprise. This is not the first such proposal, congress has vetoed all the others. The big problem now is no longer a legislative veto. The question is, who wants it. The smelter was built during World War II and it is generally conceded that it must operate at close to capacity to be profitable. With (1) the world's biggest customer, the U. S. government, gradually dropping off the market, (2) a currently irregular-to-weak market (3) the International Tin Group to control inflationary price, it looks like the government will have to look far and wide to find a buyer. And once closed down it would be economically impossible to reopen profitably. The time of decision will probably be in 1957 when the government is expected to have completed stockpile requirements.

MAGNESIUM . . . Primary production and wrought products shipments were both off in February from previous month, according to the Magnesium Assn. However, while ingot production of 5908 tons was 7 pct below January, it was still higher than the corresponding month in 1955 by 27 pct.

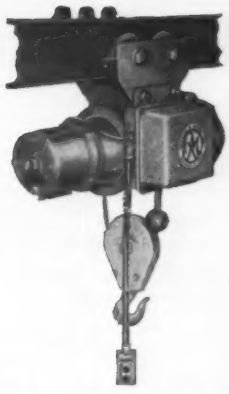
The 951 tons of wrought products shipped in February 1956 were noticeably less than the 1059 that went out in January, but again the figures show an increase over February 1955,

Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Apr. 4	Apr. 5	Apr. 6	Apr. 7	Apr. 9	Apr. 10
Copper, electro, Conn.	46.00	46.00	46.00	....	46.00	46.00
Copper, Lake, delivered	46.00	46.00	46.00	....	46.00	46.00
Tin, Straits, New York	99.75	99.875	99.875	....	99.50	99.50*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	13.50	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	15.80	15.80

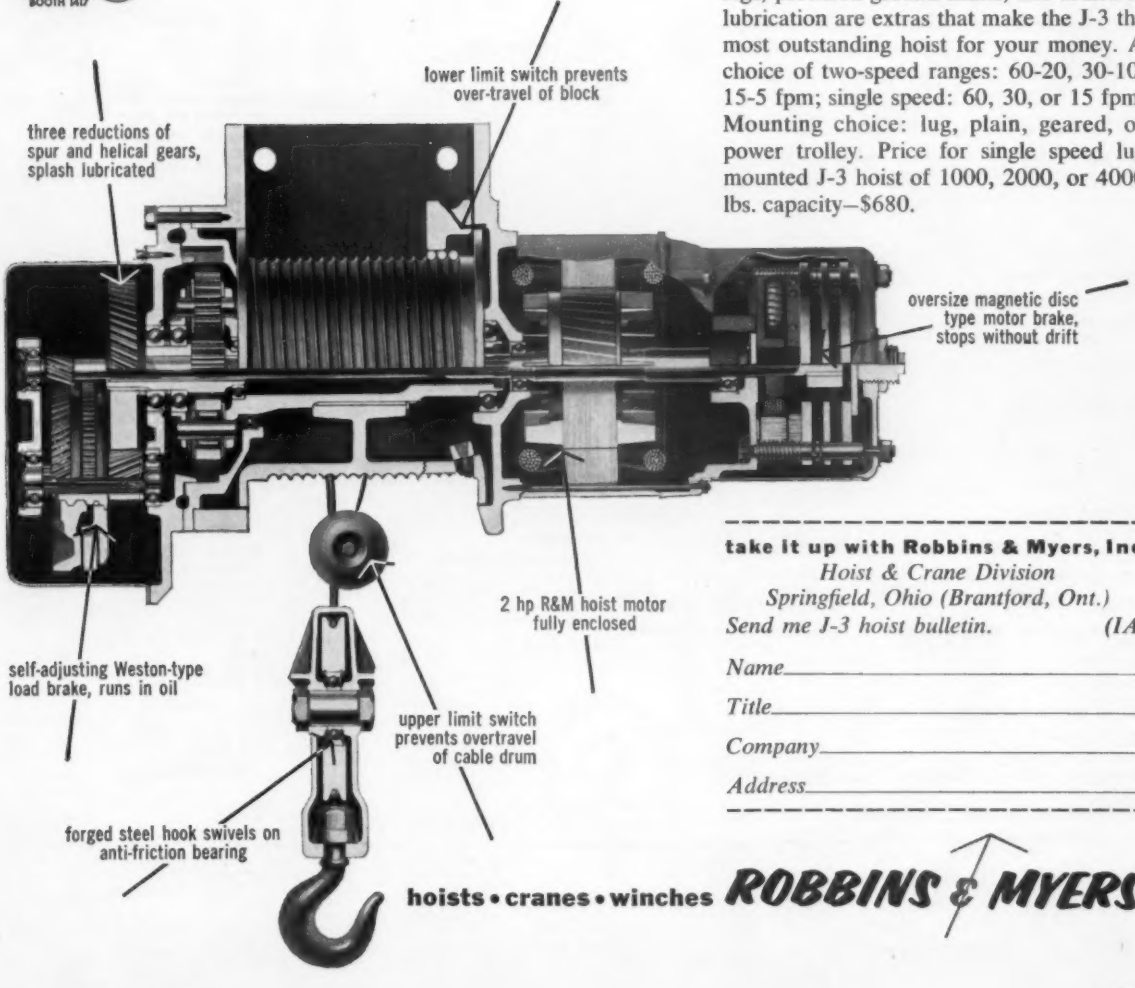
Note: Quotations are going prices. **Tentative*



too much hoist?

MATERIAL HANDLING INSTITUTE'S EXPOSITION Cleveland, Ohio 1956 mhi BOOTH 1417

R&M J-3 hoists have specific points of superiority that go beyond what hoist users usually consider "adequate." The 2 hp R&M high torque hoist motor, designed and built for full-time, full-load hoist duty, has the highest motor rating found in any standard hoist (30 min., 55 degrees C.), giving it ample reserve for accidental overloads. Power is transmitted through three reductions of cut helical and spur gears, insead of the usual two. Oversize ball bearings, precision ground shafts, and sealed-in lubrication are extras that make the J-3 the most outstanding hoist for your money. A choice of two-speed ranges: 60-20, 30-10, 15-5 fpm; single speed: 60, 30, or 15 fpm. Mounting choice: lug, plain, geared, or power trolley. Price for single speed lug mounted J-3 hoist of 1000, 2000, or 4000 lbs. capacity—$680.


lower limit switch prevents over-travel of block
three reductions of spur and helical gears, splash lubricated
oversize magnetic disc type motor brake, stops without drift
2 hp R&M hoist motor fully enclosed
self-adjusting Weston-type load brake, runs in oil
upper limit switch prevents overtravel of cable drum
forged steel hook swivels on anti-friction bearing

take it up with Robbins & Myers, Inc.
Hoist & Crane Division
Springfield, Ohio (Brantford, Ont.)
Send me J-3 hoist bulletin. *(IA)*

*Name*_____

*Title*_____

*Company*_____

*Address*_____

hoists • cranes • winches **ROBBINS & MYERS**

Nonferrous Prices *(Effective April 10, 1936)*

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

Flat Sheet (Mill Finish) and Plate

("F" temper except 6061-0)

Alloy	.032	.081	.136–.249	.250–3.
1100, 3003	42.3	40.2	39.0	38.0
5052	49.8	44.9	43.2	41.4
6061-0	46.9	42.7	40.9	40.8

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6–8	43.1–44.8	58.1–61.7
12–14	43.8–45.2	59.0–63.3
24–26	46.8–47.2	69.2–73.6
36–38	55.1–55.7	92.0–95.8

Screw Machine Stock—2011-T-3

Size"	¼	⅜–⅝	¾–1	1¼–1½
Price	56.0	54.9	53.6	51.6

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length" →	72	96	120	144
.019 gage	$1.310	$1.742	$2.175	$2.605
.024 gage	1.630	2.177	2.707	3.247

MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type → Gage→	.250-3.00	.250-2.00	.125	.064	.032
AZ31A Stand. Grade	.....	61	63.5	78	99
AZ31A Spec.	.....	79	83	100	145
Tread Plate	64	.....	68	.....	.....
Tooling Plate	65	.....	.....	.....	.....

Extruded Shapes

	1" diam. rod	shapes lb/ft 0.3	1.0	4.0	2" OD x ⅛" W. tubing
Comm. Grade (FS)	61.50	65.4–72.4	61.9–67.3	57.7–62.2	74.5
Spec. Grade (AZ31B)	73	76.9–83.9	73.4–78.8	69.2–73.7	86

Alloy Ingot

AZ91B (Die Casting) ..... 31 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 36 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	102	83	99
Strip, CR	102	92	125
Rod, Bar, HR	87	74	93
Angles, HR	87	74	93
Plate, HR	97	87	95
Seamless tube	122	110	153
Shot, Blocks	...	71	...

COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	68.63	.....	.....	68.82
Brass, 70/30	56.60	57.14	.....	59.51
Brass, Low	61.35	61.89	61.29	64.16
Brass, R L	63.07	63.61	63.01	65.88
Brass, Naval	59.80	65.06	54.11	62.96
Muntz Metal	57.84	51.85	53.65	.....
Comm. Bz.	65.33	65.87	65.27	67.89
Mang. Bz.	63.54	66.19	57.64	.....
Phos. Bz. 5%	86.79	84.44	87.29	.....

TITANIUM

(10,000 lb base, f.o.b. mill)

Sheet and strip, commercially pure, $13.10-$13.60; alloy $15.25-$15.75; Plate, HR, commercially pure, $10.50-$11.00; alloy, $11.50-$12.00. Wire, rolled and/or drawn, commercially pure, $9.50-$11.50; alloy, $11.50; Bar, HR or forged, commercially pure, $7.90-$8.15; alloy, $7.90-$8.10.

PRIMARY METAL

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb. freight allowed 25.90
Aluminum pig 24.00
Antimony, American, Laredo, Tex. 33.50
Beryllium copper, per lb cont'd Be $43.00
Beryllium aluminum 5% Be, Dollars per lb contained Be $74.75
Bismuth, ton lots ..... $ 2.25
Cadmium, del'd ..... $ 1.70
Cobalt, 97-99% (per lb) ..... $2.60 to $2.67
Copper, electro, Conn. Valley 46.00
Copper, Lake, delivered 46.00
Gold, U. S. Treas., per troy oz. $35.00
Indium, 99.9% dollars per troy oz. $ 2.25
Iridium, dollars per troy oz. ..... $100 to $120
Lead, St. Louis 15.80
Lead, New York 16.00
Magnesium, 99.8+%, f.o.b. Velasco, Tex., 10,000 lb, pig 32.50
ingot 33.25
Magnesium, sticks, 100 to 500 lb. 53.00
Mercury, dollars per 76-lb flask, f.o.b. New York ..... $262 to $265
Nickel electro 64.50
Nickel oxide sinter at Copper Cliff, Ont., contained nickel 60.75
Palladium, dollars per troy oz. ..... $23 to $24
Platinum, dollars per troy oz. ..... $97 to $107
Silver, New York, cents per troy oz. 90.875
Tin, New York 99.50*
Titanium sponge, grade A-1 ..... $3.15 to $3.45
Zinc, East St. Louis 13.50
Zinc, New York 14.00
Zirconium sponge $10.00
*Tentative

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5-5 ingot
No. 115 ..... 44.00
No. 120 ..... 43.00
No. 123 ..... 42.00
80-10-10 ingot
No. 305 ..... 47.75
No. 315 ..... 46.00
88-10-2 ingot
No. 210 ..... 60.75
No. 215 ..... 56.75
No. 245 ..... 50.75
Yellow ingot
No. 405 ..... 34.75
Manganese bronze
No. 421 ..... 39.25

Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys
0.30 copper max. 31.50-32.50
0.60 copper max. 31.25-32.25
Piston alloys (No. 122 type) 32.50-33.50
No. 12 alum. (No. 2 grade) 30-00-31.50
108 alloy 30.00-30.50
195 alloy 31.50-32.25
13 alloy (0.60 copper max.) 31.25-32.25
AXS-679 ..... 30.00-30.50

Steel deoxidizing aluminum, notch bar granulated or shot

Grade 1—95-97½% 29.50-31.25
Grade 2—92-95% 29.00-30.25
Grade 3—90-92% 28.50-29.50
Grade 4—85-90% 28.00-29.00

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	42½	42¾
Yellow brass	32¼	29⅞
Red brass	38¼	37½
Comm. bronze	39⅞	39⅛
Mang. bronze	27⅞	29⅛
Yellow brass rod ends	32	....

Custom Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 44 —44½
No. 2 copper wire ..... 42½—43
Light copper ..... 40 —40½
*Refinery brass 40
* Dry copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire ..... 44 —44½
No. 2 copper wire ..... 42½—43
Light copper ..... 40 —40½
No. 1 composition 36½
No. 1 comp. turnings 36
Hvy. yellow brass solids 26
Brass pipe 27
Radiators 28½

Aluminum

Mixed old cast. ..... 20 —21
Mixed new clips ..... 21 —22
Mixed turnings, dry ..... 20½—21½

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire 42½—43
No. 2 heavy copper and wire. 39½—40
Light copper ..... 37½—38
New type shell cuttings ..... 36½—37
Auto radiators (unsweated) .. 24 —24½
No. 1 composition ..... 32½—33
No. 1 composition turnings .. 31½—32
Unlined red car boxes ..... 24 —24½
Cocks and faucets ..... 27 —27½
Clean heavy yellow brass .... 22½—23
Brass pipe ..... 26½—27½
New soft brass clippings .... 27½—28
No. 1 brass rod turnings .... 25 —25½

Aluminum

Alum. pistons and struts .... 18 —18½
Aluminum crankcases ..... 17¼—17¾
1100 (2S) aluminum clippings 20 —20½
Old sheet and utensils ..... 17½—18½
Borings and turnings ..... 11½—12
Industrial castings ..... 17¼—17¾
2024 (24S) clippings ..... 19½—20

Zinc

New zinc clippings ..... 8½— 9
Old zinc ..... 6 — 6½
Zinc routings 4¼
Old die cast scrap 3½

Nickel and Monel

Pure nickel clippings ..... $2.25-$2.30
Clean nickel turnings ..... $2.00-$2.25
Nickel anodes ..... $2.25-$2.30
Nickel rod ends ..... $2.25-$2.30
New Monel clippings $1.00
Clean Monel turnings 85
Old sheet Monel $1.00
Nickel silver clippings, mixed. 25
Nickel silver turnings, mixed . 21

Lead

Soft scrap lead ..... 12½—13
Battery plates (dry) ..... 7 — 7¼
Batteries, acid free 4½

Miscellaneous

Block tin ..... 84 —85
No. 1 pewter ..... 66 —67
Auto babbitt ..... 43½—44½
Mixed common babbitt 15½
Solder joints ..... 20 —20½
Siphon tops 50
Small foundry type ..... 16¼—16½
Monotype ..... 15½—16
Lino. and stereotype ..... 14½—15
Electrotype ..... 13 —13⅛
Hand picked type shells ..... 10½—11
Lino. and stereo. dross ..... 5⅝— 6
Electro. dross ..... 4¾— 5

IRON AGE

STEEL PRICES

(Effective April 10, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$96.00 *B3*		4.65 *B3*	6.80 *B3*	4.65 *B3*						
	Buffalo, N. Y.	$68.50 *B3*	$84.50 *R3 B3*	$96.00 *R3, B3*	5.45 *B3*	4.65 *B3*	6.80 *B3*	4.65 *B3*	4.325 *R3,B3*	6.25 *B3* 6.25 *R7,S10*	6.425 *B3*	9.10 *B3*		
	Claymont, Del.													
	Harrison, N. J.													13.45 *C11*
	Conshohocken, Pa.								4.375 *A2*	6.30 *A2*	6.425 *A2*			
	New Bedford, Mass.									6.70 *R6*				
	Johnstown, Pa.	$68.50 *B3*	$84.50 *B3*	$96.00 *B3*		4.65 *B3*	6.80 *B3*							
	Boston, Mass.									6.80 *T8*				13.80 *T8*
	New Haven, Conn.									6.70 *D1 A5*				
	Phoenixville, Pa.					5.15 *P2*		5.15 *P2*						
	Sparrows Pt., Md.								4.325 *B3*	6.25 *B3*	6.425 *B3*	9.10 *B3*		
	Bridgeport, Wallingford, Conn.	$73.50 *N8*	$89.50 *N8*						4.625 *N8*	6.70 *W1*			7.50 *N8*	
	Pawtucket, R. I. Worcester, Mass.									6.80 *N7 A5*				*A5* 13.80 *N7*
MIDDLE WEST	Alton, Ill.								4.50 *L1*					
	Ashland, Ky.								4.325 *A7*					
	Canton-Massillon, Dover, Ohio		$86.50 *R3*	$96.00 *R3*										13.45 *G4*
	Chicago, Ill.	$68.50 *U1*	$84.50 *R3, U1,W8*	$96.00 *R3, U1,W8*	5.45 *U1*	4.60 *U1, W8*	6.75 *U1, Y1*	4.60 *U1*	4.55 *A1* 4.325 *N4,W8*	6.35 *A1,T8*			7.20 *W8*	13.45 *T8*
	Cleveland, Ohio									6.25 *A5,J3*		9.30 *A5*		13.45 *A5*
	Detroit, Mich			$96.00 *R5*					4.425 *G3,M2*	6.35 *D1,D2, G3,M2,P11*	6.525 *G3*	9.20 *D2, G3*		
	Duluth, Minn.													
	Gary, Ind. Harbor, Indiana	$68.50 *U1*	$84.50 *U1*	$96.00 *U1, Y1*	5.45 *I3*	4.60 *U1, I3*	6.75 *U1, I3*		4.425 *I3, U1,Y1*	6.35 *I3* 6.25 *Y1*	6.425 *I3, U1,Y1*	9.30 *Y1*	7.20 *Y1, U1*	
	Sterling, Ill.								4.425 *N4*					
	Indianapolis, Ind									6.40 *C5*				
	Newport, Ky.												7.20 *N5*	
	Middletown, Ohio									6.45 *A7*				
	Niles, Warren, Ohio Sharon, Pa.	$68.50 *C10*	$84.50 *C10*	$96.00 *C10*					4.325 *S1, R3*	6.25 *S1, R3,T4*	6.425 *S1, R3*	9.10 *S1, R3*	7.20 *S1*	13.45 *S1*
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	68.50 *U1, J3*	$84.50 *J3, U1,C11*	$96.00 *U1, C11*	5.45 *U1*	4.60 *U1, J3*	6.75 *U1, J3*	4.60 *U1*	4.325 *P6*	6.25 *S7,B4*			7.20 *S9*	13.45 *S9*
	Portsmouth, Ohio													
	Weirton, Wheeling, Follansbee, W. Va.					4.60 *W3*			4.325 *W3*	6.25 *F3,W3*	6.425 *W3*	9.10 *W3*		
	Youngstown, Ohio		$84.50 *C10*	$96.00 *Y1, C10*			6.75 *Y1*		4.325 *U1, Y1*	6.25 *Y1,C5*	6.425 *U1, Y1*	9.30 *Y1*	7.20 *U1, Y1*	13.45 *C5*
WEST	Fontana, Cal.	78.00 *K1*	94.00 *K1*	117.00 *K1*		5.30 *K1*	7.40 *K1*	5.45 *K1*	5.125 *K1*	8.00 *K1*	7.575 *K1*		8.95 *K1*	
	Geneva, Utah		$84.50 *C7*			4.60 *C7*	6.75 *C7*							
	Kansas City, Mo.					4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	
	Los Angeles, Torrance, Cal.		$94.00 *B2*	$116.00 *B2*		5.30 *C7, B2*	7.45 *B2*		5.875 *C7, B2*	8.30 *C1*			8.40 *B2*	
	Minnequa, Colo.					4.90 *C6*			5.425 *C6*					
	Portland, Ore.					5.35 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$94.00 *B2*			5.25 *B2, P9*	7.40 *B2*		5.875 *B2, C7*					
	Seattle, Wash.		$98.00 *B2*			5.35 *B2*	7.50 *B2*		5.325 *B2*					
SOUTH	Atlanta, Ga.								4.525 *A8*					
	Fairfield, Ala. City, Birmingham, Ala.	$68.50 *T2*	$84.50 *T2*			5.10 *C16* 4.60 *R3,T2*	6.75 *T2*		4.325 *R3,T2* 4.825 *C10*		6.425 *T2*			
	Houston, Lone Star, Texas	$74.50 *L3*	$89.50 *S2*	$101.00 *S2*		4.70 *S2*	6.85 *S2*				6.675 *S2*		7.45 *S2*	

IRON AGE

STEEL PRICES

(Effective April 10, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.
EAST	Bethlehem, Pa.													
	Buffalo, N. Y.	4.325 *B3*	5.325 *B3*				6.375 *B3*	7.875 *B3*			5.375 *W6*	† Special coated mfg. terne deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct $2.20 from 1.25-lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.	4.375 *A2*	5.375 *A2*				6.425 *A2*							
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.										5.375 *B3*			
	Fairless, Pa.	4.375 *U1*	5.375 *U1*				6.425 *U1*	7.925 *U1*				$9.30 *U1*	$8.00 *U1*	
	New Haven, Conn.													
	Phoenixville, Pa.													
	Sparrows Pt., Md.	4.325 *B3*	5.325 *B3*	5.85 *B3*			6.375 *B3*	7.875 *B3*	8.60 *B3*		5.475 *B3*	$9.30 *B3*	$8.00 *B3*	
	Worcester, Mass.										5.675 *A5*			
	Trenton, N. J.													
MIDDLE WEST	Alton, Ill.										5.55 *L1*			
	Ashland, Ky.	4.325 *A7*		5.85 *A7*	5.90 *A7*									
	Canton-Massillon, Dover, Ohio			5.85 *R1, R3*										
	Chicago, Joliet, Ill.	4.55 *A1* 4.325 *W8*					6.375 *U1*				5.375 *N4* 5.375 *A5 R3*			
	Sterling, Ill.										5.475 *N4*			
	Cleveland, Ohio	4.325 *J3, R3*	5.325 *J3, R3*		5.90 *R3*		6.375 *J3, R3*	7.875 *J3, R3*			5.375 *A5*			
	Detroit, Mich.	4.425 *G3, M2*	5.425 *G3* 5.325 *M2*				6.475 *G3*	7.975 *G3*						
	Newport, Ky.	4.325 *N5*	5.325 *N5*	5.85 *N5*										
	Gary, Ind. Harbor, Indiana	4.325 *I3, U1, Y1*	5.325 *I3, U1, Y1*	5.85 *U1, I3*	5.90 *U1, I3*	6.25 *U1*	6.375 *Y1, U1, I3*	7.875 *U1, Y1*			5.375 *Y1*	$9.20 *I3, U1, Y1*	$7.90 *I3, U1, Y1*	6.65 *U1, Y1*
	Granite City, Ill.	4.525 *G2*	5.525 *G2*	6.05 *G2*	6.10 *G2*								$8.00 *G2*	6.75 *G2*
	Kokomo, Ind.			5.95 *C9*							5.475 *C9*			
	Mansfield, Ohio	4.325 *E2*	5.325 *E2*			6.25 *E2*								
	Middletown, Ohio		5.325 *A7*	5.85 *A7*	5.90 *A7*	6.25 *A7*								
	Niles, Warren, Ohio Sharon, Pa.	4.325 *S1, R3, N3*	5.325 *R3, N3*	5.85 *R3* 6.85 *N3*	5.90 *N3*	6.25 *N3*	6.375 *S1, R3*	7.875 *R3*				$9.20 *R3*	$7.90 *R3*	
	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.325 *J3, U1 P6*	5.325 *J3, U1, P6*	5.85 *U1*	5.90 *U1, A7*		6.375 *J3, U1*	7.875 *U1*	8.60 *U1*		5.025 *P6* 5.375 *A5*	$9.20 *J3, U1*	$7.90 *J3, U1*	6.65 *U1*
	Portsmouth, Ohio	4.325 *P7*	5.325 *P7*								5.375 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	4.325 *W3, W5*	5.325 *W3, W5, F3*	5.85 *W3, W5*		6.25 *W3, W5*	6.375 *W3*	7.875 *W3*				$9.20 *W3, W5*	$7.90 *W3, W5*	6.65 *F3, W5*
	Youngstown, Ohio	4.325 *U1, Y1*	5.325 *Y1*		5.90 *Y1*		6.375 *U1, Y1*	7.875 *Y1*			5.375 *Y1*			
WEST	Fontana, Cal.	5.125 *K1*	6.525 *K1*				7.175 *K1*	9.075 *K1*						
	Geneva, Utah	4.425 *C7*												
	Kansas City, Mo.										5.625 *S2*			
	Los Angeles, Torrance, Cal.										6.175 *B2*			
	Minnequa, Colo.										5.625 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.025 *C7*	6.275 *C7*	6.60 *C7*							5.675 *C7*	$9.95 *C7*	$8.65 *C7*	
	Seattle, Wash.													
SOUTH	Atlanta, Ga.													
	Fairfield, Ala. Alabama City, Ala.	4.325 *R3, T2*	5.325 *T2*	5.85 *R3, T2*			6.375 *T2*			5.625 *R3*	5.025 *R3* 5.375 *T2*	$9.30 *T2*	$8.00 *T2*	
	Houston, Tex.										5.625 *S2*			

IRON AGE

STEEL PRICES

(Effective April 16, 1956)

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				5.575 *B3*	7.425 *B3*	6.80 *B1*					
	Buffalo, N. Y.	4.65 *B3,R3*	4.65 *B3,R3*	6.30 *B5*	5.575 *B3,R3*	7.425 *B3,B5*	6.80 *B3*	4.50 *B3,R3*				6.60 *W6*
	Claymont, Del.							4.80 *C4*		6.30 *C4*	6.725 *C4*	
	Coatesville, Pa.							4.80 *L4*		6.30 *L4*	6.725 *L4*	
	Conshohocken, Pa							4.50 *A2*	5.575 *A2*		6.725 *A2*	
	Harrisburg, Pa.							5.10 *P2*	5.575 *C3*			
	Hartford, Conn.			6.75 *R3*		7.725 *R3*						
	Johnstown, Pa.	4.65 *B3*	4.65 *B3*		5.575 *B3*		6.80 *B3*	4.50 *B3*		6.30 *B3*	6.725 *B3*	6.60 *B3*
	Fairless, Pa.	4.80 *U1*	4.80 *U1*		5.725 *U1*							
	Newark, N. J.			6.70 *W10*		7.60 *W10*						
	Camden, N. J.			6.70 *P10*								
	Bridgeport, Putnam, Conn.	4.80 *N8*		6.80 *W10*	5.725 *N8*			4.750 *N8*				
	Sparrows Pt., Md.		4.65 *B3*					4.50 *B3*		6.30 *B3*	6.725 *B3*	6.70 *B3*
	Palmer, Worcester, Readville, Mass. Milton, Pa.	4.80 *M7*	4.80 *M7*	6.70 *W11* 6.45 *C14* 6.70 *B5*		7.725 *A5,B5*		4.50 *R3*				6.90 *A5* 6.90 *W6*
	Spring City, Pa.			6.35 *K4*		7.60 *K4*						
MIDDLE WEST	Alton, Ill.	4.85 *L1*										6.775 *L1*
	Ashland, Newport, Ky.							4.50 *A7,N5*		6.30 *N5*		
	Canton-Massillon, Mansfield, Ohio	4.75 *R3*		6.25 *R2,R3*	5.575 *R3,T5*	7.425 *R2,R3, T5*		4.50 *E1*				
	Chicago, Joliet, Ill.	4.65 *U1, N4,W8,R3,* 5.15 *P13*	4.65 *N4,R3,* 5.15 *P13*	6.25 *B5,W8, W10,A5,L2*	5.575 *U1,R3, W8*	7.425 *A5,W8, W10,L2,B5*		4.50 *U1,W8, I3,R3* 4.725 *A1*	5.575 *U1*	6.30 *U1*	6.725 *U1*	6.60 *A5,R3, N4,W7*
	Cleveland, Ohio	4.65 *R3*	4.65 *R3*	6.25 *A5,C13*		7.425 *A5,C13*	6.80 *R3*	4.60 *J3,R3*	5.575 *J3*		6.725 *R3,J3*	6.60 *A5, C13*
	Detroit, Mich.	4.75 *G3*	4.75 *G3*	5.90 *R5* 6.45 *B5* 6.15 *P3* 6.10 *P8*	5.575 *R5* 5.675 *G3*	7.425 *R5* 7.625 *B5,P3, P8*	6.90 *G3*	4.60 *G3*			6.825 *G3*	
	Duluth, Minn.											6.60 *A5*
	Gary, Ind. Harbor, Crawfordsville	4.65 *I3, U1, Y1*	4.65 *I3, U1, Y1*	6.25 *M5,R3*	5.575 *I3, U1, Y1*	7.425 *M5, R3*	6.80 *U1,I3, Y1*	4.50 *I3, U1, Y1*	5.575 *I3*	6.30 *U1,Y1*	6.725 *U1, I3,Y1*	6.35 *M4*
	Granite City, Ill.							4.70 *G2*				
	Kokomo, Ind.											6.70 *C9*
	Sterling, Ill.	4.75 *N4*	4.75 *N4*									6.70 *N4*
	Niles, Warren, Ohio Sharon, Pa.	4.65 *R3,C10*		6.25 *C10*	5.75 *C10*	7.425 *C10*	6.80 *R3*	4.50 *S1,R3*		6.30 *S1*	6.725 *S1*	
	Pittsburgh, Pa. Midland, Pa.	4.65 *J3, U1, C11*	4.65 *J3, U1*	6.25 *A5,C8, C11,J3, W10,B4,R3*	5.575 *U1,C11*	7.425 *A5,C11, W10,C8,R3*	6.80 *J3, U1*	4.50 *J3, U1*	5.575 *U1*	6.30 *U1*	6.725 *J3, U1*	6.60 *A5,J3, P6*
	Portsmouth, Ohio											6.60 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.65 *W3*						4.50 *W3,W5*				
	Youngstown, Ohio	4.65 *U1,Y1, C10,R3*	4.65 *U1,Y1, R3*	6.25 *Y1, U1*	5.575 *U1,Y1, C10*	7.425 *Y1,C10, F2*	6.80 *U1,Y1*	4.50 *U1,Y1, R3*		6.30 *Y1*	6.725 *Y1*	6.60 *Y1*
WEST	Emeryville, Cal.	5.40 *J5*	5.40 *J5*									
	Fontana, Cal.	5.35 *K1*	5.35 *K1*		6.625 *K1*		7.50 *K1*	5.20 *K1*		7.00 *K1*	7.375 *K1*	
	Geneva, Utah							4.50 *C7*			6.725 *C7*	
	Kansas City, Mo.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*					6.85 *S2*
	Los Angeles, Torrance, Cal.	5.35 *B2,C7*	5.35 *B2,C7*	7.70 *R3*	6.625 *B2*		7.50 *B2*				7.625 *B2*	7.55 *B2*
	Minnequa, Colo.	5.10 *C6*	5.10 *C6*					5.35 *C6*				6.85 *C6*
	Portland, Ore.	5.40 *O2*	5.40 *O2*									
	San Francisco, Niles, Pittsburg, Cal.	5.35 *C7* 5.40 *B2,P9*	5.35 *C7* 5.40 *B2,P9*				7.55 *B2*					7.55 *C7* 7.55 *C6*
	Seattle, Wash.	5.40 *B2,P12, N6*	5.40 *B2 P12*				7.55 *B2*	5.40 *B2*		7.20 *B2*	7.625 *B2*	
SOUTH	Atlanta, Ga.	4.85 *A8*	4.85 *A8*									6.80 *A8*
	Fairfield, Ala. City, Birmingham, Ala.	4.65 *T2,R3* 5.15 *C16*	4.65 *T2,R3* 5.15 *C16*				6.80 *T2*	4.50 *T2,R3*			6.725 *T2*	6.60 *R3, T2*
	Houston, Ft. Worth, Lone Star, Tex.	4.90 *S2*	4.90 *S2*		5.825 *S2*		7.05 *S2*	4.85 *L3* 4.60 *S2*		6.40 *S2*	6.825 *S2*	6.85 *S2*

Steel Prices *(Effective April 16, 1956)*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin, Inc., Harvey, Ill.
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown, O.
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Pittsburgh, Pa.
C11 Crucible Steel Co. of America, Pittsburgh
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland
C14 Compressed Steel Shafting Co., Readville, Mass.
C15 G. O. Carlson, Inc., Thorndale, Pa.
C16 Connors Steel Div., Birmingham
C17 Chester Blast Furnace, Inc., Chester, Pa.

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.
D4 Dickson Weatherproof Nail Co., Evanston, Ill.
D5 Henry Disston & Sons, Inc., Philadelphia

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling, Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit
G4 Greer Steel Co., Dover, O.

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago
J5 Judson Steel Corp., Emeryville, Calif.

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.
K4 Keystone Drawn Steel Co., Spring City, Pa.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Div., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.
M7 Milton Steel Products Div., Milton, Pa.

N1 National Supply Co., Pittsburgh
N2 National Tube Div., Pittsburgh
N3 Niles Rolling Mill Div., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.
N5 Newport Steel Corp., Newport, Ky.
N6 Northwest Steel Rolling Mills, Seattle
N7 Newman Crosby Steel Co., Pawtucket, R. I.
N8 Northeastern Steel Corp., Bridgeport, Conn.

O1 Oliver Iron & Steel Co., Pittsburgh
O2 Oregon Steel Mills, Portland

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp., Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.
P10 Precision Drawn Steel Co., Camden, N. J.
P11 Production Steel Strip Corp., Detroit
P12 Pacific Steel Rolling Mills, Seattle
P13 Phoenix Mfg. Co., Joliet, Ill.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div., Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co., John A., Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit
R6 Rodney Metals, Inc., New Bedford, Mass.
R7 Rome Strip Steel Co., Rome, N. Y.

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw and Steel Co., Fitchburg, Mass.
S5 Sweet's Steel Co., Williamsport, Pa.
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa.
S10 Seneca Steel Service, Buffalo

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessee Coal & Iron Div., Fairfield
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.
T7 Texas Steel Co., Fort Worth
T8 Thompson Wire Co., Boston

U1 United States Steel Corp., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.
U3 Ulbrich Stainless Steels, Wallingford, Conn.
U4 U. S. Pipe & Foundry Co., Birmingham

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh
W11 Worcester Pressed Steel Co., Worcester, Mass.
W12 Wallace Barnes Steel Div., Bristol, Conn.

Y1 Youngstown Sheet & Tube Co., Youngstown, O.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Youngstown *R3*	18.50	1.25	21.50	5.25	24.00	8.75	26.50	10.00	27.00	11.00	27.50	11.50	29.00	11.75								
Fontana *K1*	6.00	13.25	9.00	+9.25	11.50	+5.75	14.00	+4.00	14.50	+3.00	15.00	+2.50	16.50	+1.75								
Pittsburgh *J3*	18.50	1.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Alton, Ill. *L1*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Sharon *M3*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Fairless *N2*	16.50	1.25	19.50	5.25	22.00	8.75	24.50	9.50	25.00	10.50	25.50	11.00	27.00	10.75								
Pittsburgh *N1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Wheeling *W5*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Wheatland *W4*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75								
Youngstown *Y1*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
Indiana Harbor *Y1*	17.50	2.25	20.50	6.25	23.00	9.75	25.50	10.00	26.00	11.50	26.50	12.00	28.00	11.75								
Lorain *N2*	18.50	3.25	21.50	7.25	24.00	10.75	26.50	11.50	27.00	12.50	27.50	13.00	29.00	12.75	6.50	+8.50	10.50	+6.25	13.00	+3.75	14.50	+2.25
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Youngstown *R3*	23.00	7.25	27.00	11.25	29.00	14.75	29.50	14.00	30.00	15.00	30.50	15.50	31.00	14.75								
Fairless *N2*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Fontana *K1*	10.50		14.50		16.50		17.00		17.50		18.00		18.50									
Pittsburgh *J3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Alton, Ill. *L1*	21.00	7.25	25.00	11.25	27.00	14.75	27.50	13.50	28.00	14.50	28.50	15.00	29.00	13.75								
Sharon *M3*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Pittsburgh *N1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Wheeling *W5*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Wheatland *W4*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75								
Youngstown *Y1*	23.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75
Indiana Harbor *Y1*	22.00	8.25	26.00	12.25	28.00	15.75	28.50	14.50	29.00	15.50	29.50	16.00	30.00	14.75								
Lorain *N2*	21.00	9.25	27.00	13.25	29.00	16.75	29.50	15.50	30.00	16.50	30.50	17.00	31.00	15.75	8.00	+6.00	13.00	+2.75	15.50	+0.25	20.50	4.75

Threads only, buttweld and seamless 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 11¢ to 13¢ would lower discounts; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	$1.60	T-1
18	4	1	—	5	2.305	T-4
18	4	2	—	—	1.765	T-2
1.5	4	1.5	8	—	.96	M-1
6	4	3	6	—	1.35	M-3
6	4	2	5	—	1.105	M-2

High-carbon chromium	.77	D-3, D-5
Oil hardened manganese	.43	O-2
Special carbon	.39	W-1
Extra carbon	.33	W-1
Regular carbon	.275	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*A3, J2, L4*) 10 pct	Plate (*A3, J2, L4*) 15 pct	Plate (*A3, J2, L4*) 20 pct	Sheet (*I2*) 20 pct
Stainless Type	304	30.30	33.15	36.05	32.50
	316	35.50	38.45	41.40	47.00
	321	32.00	34.85	37.75	37.25
	347	34.40	37.90	41.40	48.25
	405	25.80	29.60	33.35	
	410, 430	25.30	29.10	32.85	

CR Strip (S9) Copper, 10 pct, 2 sides, 33.00; 1 side, 30.00.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length) Semi-Processed	Cold-Reduced (Coiled or Cut Length) Fully Processed
Field	8.40	8.60	.....
Armature	9.35	9.60	10.10
Elect.	9.95	10.20	10.70
Motor	10.95	11.20	11.70
Dynamo	11.85	12.10	12.60
Trans. 72	12.80	13.05	13.55
		Grain Oriented	
Trans. 65	13.35	Trans. 80	17.45
Trans. 58	13.85	Trans. 73	17.95
Trans. 52	14.85		

Producing points: Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*); Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*N5*); Niles, O. (*N3*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville (*A7*).

* Coils 75¢ higher.

LAKE SUPERIOR ORES

51.50% *Fe natural content, delivered lower Lake ports. Prices for 1956 season. Freight changes for seller's account.*

	Gross Ton
Openhearth lump	$12.10
Old range, bessemer	11.25
Old range, nonbessemer	11.10
Mesabi, bessemer	11.00
Mesabi, nonbessemer	10.85
High phosphorus	10.85

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails Col	Woven Wire Fence 9-15½ ga. Col	"T" Fence Posts Col	Single Loop Bale Ties Col	Galv. Barbed and Twisted Barbless Wire Col	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Galv. ¢/lb.
Alabama City *R3*	152	162		173	175	7.40	7.80
Aliquippa, Pa. *J3*	152	162				7.40	7.80
Atlanta *A8*	154	167		177	180	7.60	8.125
Bartonville *K2**	154	168		175	181	7.60	8.20
Buffalo *W6*						7.50	7.90
Chicago, Ill. *N4***	152	166		175	179	7.50	8.10
Cleveland *A6*	157					7.50	
Cleveland *A5*						7.40	
Crawfordsville *M4**	154	168		177	181	7.60	8.20
Donora, Pa. *A5*	152	162		175	175	7.50	7.90
Duluth *A5*	152	162		175	175	7.50	7.90
Fairfield, Ala. *T2*	152	162		175	175	7.50	7.90
Galveston *D4*	157						
Houston *S2*	157	170			180	7.65	8.05
Johnstown, Pa. *B3**	152	168			175	7.40	7.80
Joliet, Ill. *A5*	152	162		175	175	7.50	8.10
Kokomo, Ind. *C9*	154	154		177	177	7.60	8.00
Los Angeles *B2**						8.35	8.925
Kansas City *S2*	157	167		178	180	7.65	8.05
Minnequa *C6*	157	167	162	178	180	7.65	8.05
Monessen *P6*	152	162				7.40	7.80
Moline, Ill. *R3*		162	162				
Pittsburg, Cal. *C7*	171	185		199	195	8.45	8.85
Portsmouth *P7*						7.50	
Rankin, Pa. *A5*	152	162			175	7.40	7.90
So. Chicago *R3*	152	162	157	173	175	7.40	7.60
S. San Francisco *C6*				197	195	8.35	8.75
Sparrows Pt. *B3**	154			175	181	7.60	8.20
Struthers, O. *Y1*						7.40	7.90
Worcester *A5*	158					7.70	8.20
Williamsport, Pa. *S5*			160				

Galvanized products computed with zinc at 5¢ per lb. Exceptions: *zinc at 12.5¢ per lb; **13¢ zinc.

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT 0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Bristol, Conn. *W12*			10.90	13.05	15.75
Buffalo, N. Y. *R7*	7.00	8.95	10.50	12.65	15.35
Carnegie, Pa. *S9*		9.05	10.60	12.75	15.35
Cleveland *A5*	7.10	9.05	10.60	12.75	15.45
Detroit *D1*	7.20	9.15	10.70	12.85	
Detroit *D2*	7.20	9.15	10.70		
Harrison, N. J. *C11*			10.90	13.05	15.75
Indianapolis *C5*	7.15	9.10	10.50	12.65	15.35
New Castle, Pa. *B4*	7.00	8.95	10.50	12.65	
New Haven, Conn. *D1*	7.55	9.35	10.90	13.05	
Pawtucket, R. I. *N7*	7.65	9.35	10.90	13.05	15.75
Pittsburgh *S7*	7.10	9.05	10.60	12.75	15.45
Riverdale, Ill. *A1*	7.20	9.05	10.60	12.75	15.45
Sharon, Pa. *S1*	7.10	9.05	10.60	12.75	15.45
Trenton *R4*					
Wallingford *W1*	7.55	9.35	10.90	13.05	15.75
Warren, Ohio *T4*	7.00	8.95	10.50	12.65	15.35
Weirton, W. Va. *W3*	7.10	8.95	10.50		
Worcester, Mass. *A5*	7.65	9.35	10.90	13.05	15.75
Youngstown *C5*	7.00	8.95	10.50	12.65	15.35

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	30.87	36.51	29.93	.....
	2½	12	41.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
National Tube	2	13	30.87	36.51	29.93	.....
	2½	12	42.57	49.16	40.31	.....
	3	12	47.99	56.76	46.55	.....
	3½	11	56.03	66.27	54.34	.....
	4	10	74.41	88.00	72.17	.....
Pittsburgh Steel	2	13	30.87	36.51	.....	.....
	2½	12	41.57	49.16	.....	.....
	3	12	47.99	56.76	.....	.....
	3½	11	56.03	66.27	.....	.....
	4	10	74.41	88.00	.....	.....

WAREHOUSES

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge**	Sheets Hot-Rolled	Sheets Cold-Rolled	Sheets Galvanized (10 gage)	Strip Hot-Rolled	Strip Cold-Rolled	Plates	Shapes Standard Structural	Bars Hot-Rolled	Bars Cold-Finished	Alloy Bars Hot-Rolled 4615 As rolled	Alloy Bars Hot-Rolled 4140 Annealed	Alloy Bars Cold-Drawn 4615 As rolled	Alloy Bars Cold-Drawn 4140 Annealed
Baltimore	$.10	7.31	8.32	8.37	7.65	.....	7.63	7.93	7.61	8.62	14.38	13.44–13.96	16.36	15.23–16.49
Birmingham	.15	6.80	7.93	8.85	7.06	.....	6.99	7.28	7.08	9.35	.....	.....	.....	.....
Boston	.10	8.22	9.17	10.42	8.31	.....	8.51	8.37	8.37	9.83	.....	13.66	.....	16.76
Buffalo	.15	7.35	8.40	10.16	7.50	.....	7.80	7.75	7.50	8.05	.....	13.45	.....	16.50
Chicago	.15	7.28	8.39	9.25	7.36	.....	7.60	7.58	7.42	7.90	.....	13.20	.....	16.30
Cincinnati	.15	7.40	8.38	9.10	7.60	.....	7.89	8.05	7.66	8.30	13.59	13.29	16.44	16.39
Cleveland	.15	7.28	8.39	9.10	7.46	.....	7.77	7.91	7.48	8.15	13.41	13.11	16.26	16.21
Denver		8.60	10.76	11.22	8.90	.....	8.60	8.75	8.90	9.82	.....	.....	.....	17.97
Detroit	.15	7.47	8.58	9.53	7.49	.....	7.88	8.05	7.70	8.19	13.70	13.40	16.55	16.50
Houston		7.85	8.75	10.49	8.15	.....	7.80	8.20	8.25	9.85–9.95	14.35	14.00	17.15	17.05
Kansas City	.20	7.47	8.76	9.17	7.73	.....	7.66	7.95	7.75	8.52	13.87	13.52	16.72	16.57
Los Angeles	.10	8.25	10.10	11.10	8.60	.....	8.85	8.40	8.25	11.00	.....	14.45	.....	18.00
Memphis	.10	7.12	8.25	.....	7.38	.....	7.31	7.60	7.40	9.15	.....	.....	.....	.....
Milwaukee	.15	7.37	8.48	9.34	7.45	.....	7.69	7.75	7.51	8.09	.....	13.29	.....	16.39
New Orleans	.15	7.20	8.35	.....	7.45	.....	7.40	7.70	7.50	9.55	.....	.....	.....	.....
New York	.10	7.88	8.98	9.73	8.33	.....	8.31	8.21	8.26	9.87	.....	13.57	.....	16.67
Norfolk	.20	7.25	.....	.....	7.65	.....	7.45	7.95	7.65	9.50	.....	.....	.....	.....
Philadelphia	.10	7.44	8.54	9.51	8.09	.....	7.82	7.85	7.83	8.62	.....	13.35	.....	16.45
Pittsburgh	.15	7.28	8.39	9.55	7.46	9.00	7.60	7.58	7.42	8.00	13.35	13.05	16.20	16.15
Portland		7.80–8.60	8.80–10.15	10.65	8.00	7.95	7.75	7.85–8.15	7.95	12.20	.....	15.00	.....	17.50
Salt Lake City	.20	.....	10.60	.....	9.35	.....	.....	9.20	9.15	.....	.....	.....	.....	.....
San Francisco	.10	8.30	9.75	10.25	8.45	.....	8.40	8.35	8.25	11.55	.....	14.45	.....	18.00
Seattle	.00	8.75	10.50	10.90	8.90	.....	8.50	8.50	8.60	12.25	.....	14.65	.....	.....
St. Louis	.15	7.57	8.68	9.54	7.65	.....	7.89	7.98	7.71	8.44	.....	13.49	.....	16.59
St. Paul	.25	7.94	8.59–9.14	9.89	7.72	.....	7.65	7.94	7.74	8.51	.....	13.51	.....	16.31

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

Exceptions. (1) 1500 to 9999 lb. (2) 1000 lb or over. (3) $.25 delivery. (4) 1000 to 1999 lb, $.25 delivery.

*Plus analysis charge. ‡Deduct for country delivery.

(Effective April 10, 1956)

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	4.725	5.65	5.825	....	....	....	....
So. Chicago *R3*	....	....	....	8.05	....	....	....
Ensley *T2*	4.725	5.65	....	....	....	....	....
Fairfield *T2*	....	5.65	....	8.05	....	5.625	....
Gary *U1*	4.725	5.65	....	....	....	5.625	....
Ind. Harbor *I3*	4.725	....	5.825	7.90	....	5.625	....
Ind. Harbor *Y1*	....	....	....	7.90	....	....	....
Johnstown *B3*	....	5.65	....	....	....	....	....
Joliet *U1*	....	5.65	5.825	....	....	....	....
Kansas City *S2*	....	....	....	7.90	....	....	....
Lackawanna *B3*	4.725	5.65	5.825	....	....	5.625	....
Lebanon *B3*	....	....	....	....	....	....	12.15
Minnequa *C6*	4.725	6.15	5.825	7.90	....	5.625	12.15
Pittsburgh *O1*	....	....	....	....	11.90	....	12.15
Pittsburgh *P5*	....	....	....	....	....	....	12.15
Pittsburgh *J3*	....	....	....	7.90	....	....	....
Seattle *B2*	....	....	....	8.40	....	5.775	12.65
Steelton *B3*	4.725	....	5.825	....	....	5.625	....
Struthers *Y1*	....	....	....	7.90	....	....	....
Torrance *C7*	....	....	....	....	....	5.775	....
Williamsport *S5*	....	5.65	....	....	....	....	....
Youngstown *R3*	....	....	....	8.05	....	....	....

COKE

Furnace, beehive (f.o.b. oven) Connellsville, Pa.	Net-Ton $14.50
Foundry, beehive (f.o.b. oven) Connellsville, Pa.	$17.00 to $18.00
Foundry, oven coke	
Buffalo, del'd	$28.75
Chicago, f.o.b.	27.00
Detroit, f.o.b.	27.50
New England, del'd	28.55
Seaboard, N. J., f.o.b.	26.75
Philadelphia, f.o.b.	26.50
Swedeland, Pa., f.o.b.	26.50
Painesville, Ohio, f.o.b.	27.50
Erie, Pa., f.o.b.	27.50
Cleveland, del'd	29.43
Cincinnati, del'd	28.59
St. Paul, f.o.b.	26.50
St. Louis, f.o.b.	28.50
Birmingham, f.o.b.	25.65
Lone Star, Tex., f.o.b.	19.50

ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	23.00	40	100, 110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.25	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2½	30	33.75			
2	24	52.50			

* Prices shown cover carbon nipples.

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Cast elliptical, 18 in. or longer, 5000 lb lots	58.92
Electrodeposited	55.25
Brass, 80-20, ball anodes, 2000 lb or more	58.00
Zinc, ball anodes, 2000 lb lots (for elliptical add 2¢ per lb)	20.75
Nickel, 99 pct plus, rolled carbon (rolled depolarized add 3¢ per lb)	90.50
Cadmium	$1.70
Tin, ball anodes and elliptical	$1.06 to $1.10

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum	83.50
Copper sulphate, 5 or more 100 lb bags, per cwt	18.15
Nickel salts, single, 4-100 lb bags	33.25
Nickel chloride, freight allowed, 300 lbs	43.50
Sodium cyanide, domestic, fob N. Y. 1 to 4 200 lb drums (Philadelphia add .50 per lb)	21.55
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum N. Y.	48.00
Chromic acid, flake type, 1 to 20 100 lb drums	31.20

BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Machine and Carriage Bolt

	Discounts Full case Quantity	Full case 20,000 lb. or more
½ in. & smaller x 6 in. & shorter	61	63
Larger than ½ in. diam. and all diam. longer than 6 in.	55	57
Rolled thread carriage bolts ½ in. & smaller x 6 in. and shorter	61	63
Lag, all diam. x 6 in. & shorter	61	63
Lag, all diam. longer than 6 in.	55	57
Plow bolts	61	63

Nuts, Hex, HP, reg. & hvy.

¾" or smaller	64	66
⅞" to 1⅛" inclusive	63	65
1¼" to 1⅝" inclusive	65	67
1⅝" and larger	61	63

C.P. Hex regular & hvy.

¾" or smaller	64	66
⅞" and larger	61	63

Hot Galv. Nuts (all types)

1½" or smaller	44	47

Finished, Semi-finished, Hex Nuts

¾" and smaller	66	66
⅞" and larger	63	63

Add 25% for less than case or keg quantity.

Rivets

	Base per 100 lb
½ in. and larger	$9.95
	Pct Off List
7/16 in. and smaller	32

Cap Screws

	Discount Bright	H.C. Heat Treated
New std. hex head, packaged ¼" thru ½" diam. x 6" and shorter	34	20
9/16" and ⅝" x 6" and smaller and shorter	31	16
¾", ⅞", 1" x 6" and shorter	9	+11
New std. hex head, bulk* ¼" thru ½" diam. x 6" and shorter	49	41
9/16" and ⅝" diam. x 6" and shorter	43	39
¾", ⅞", 1" x 6" and shorter	31	20

*Minimum quantity per item:
15,000 pieces ¼", 5/16", ⅜" diam.
5,000 pieces 7/16", ½", 9/16", ⅝" diam.
2,000 pieces ¾", ⅞", 1" diam.

Machine Screws & Stove Bolts

		Discount Mach. Screws	Stove Bolts
Packaged, package list		27	38
Bulk, bulk list	*Quantity*		
¼-in. diam. & under	25,000-200,000	20	61
5/16-in. diam. & larger	15,000-100,000	20	61
All diam. over 3 in. long	5,000-100,000	—	61

Machine Screw & Stove Bolt Nuts

		Discount Hex	Square
Packaged, package list		24	27
Bulk, bulk list	*Quantity*		
⅜-in. diam. & smaller	25,000-200,000	18	20

CAST IRON WATER PIPE INDEX

Birmingham	111.3
New York	123.5
Chicago	124.9
San Francisco-L. A.	133.1

Dec. 1955 value, Class B or heavier 6 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1 issue. Source: U. S. Pipe and Foundry Co.

REFRACTORIES

Fire Clay Brick	*Carloads per* 1000
First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5.00)	$122.00
No. 1 Ohio	....
Sec. quality, Pa., Md., Ky., Mo., Ill.	114.00
No. 2 Ohio	98.00
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50)	18.00

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$128.00
Childs, Hays, Pa.	138.00
Chicago District	138.00
Western Utah	144.00
California	151.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	145.00
Curtner, Calif.	163.00
Silica cement, net ton, bulk, Eastern (except Hays, Pa.)	21.00
Silica cement, net ton, bulk, Hays, Pa.	24.00
Silica cement, net ton, bulk, Chicago District, Ensley, Ala.	22.00
Silica cement, net ton, bulk, Utah and Calif.	32.00

Chrome Brick	*Per net ton*
Standard chemically bonded, Balt.	$91.00
Standards chemically bonded, Curtner, Calif.	101.25
Burned, Balt.	85.00

Magnesite Brick

Standard Baltimore	$114.00
Chemically bonded, Baltimore	102.00

Grain Magnesite	St. ¾-in. grains
Domestic, f.o.b. Baltimore in bulk fines removed	$64.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	40.00
in sacks	46.00

Dead Burned Dolomite	*Per net ton*
F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$15.00
Midwest	15.60
Missouri Valley	14.00

METAL POWDERS

Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.i.f. New York, ocean bags	9.50¢
Canadian sponge iron, Del'd in East, carloads	9.5¢
Domestic sponge iron, 98+% Fe, carload lots	9.5¢
Electrolytic iron, annealed, imported 99.5+% Fe	27.5¢
domestic 99.5+% Fe	36.5¢
Electrolytic iron, unannealed minus 325 mesh, 99+% Fe	57.0¢
Electrolytic iron melting stock, 99.84% pure	22.0¢
Carbonyl iron size 5 to 10 micron, 98%, 00.8+% Fe	86.0¢ to $1.55
Aluminum freight allowed	38.00¢
Brass, 10 ton lots	37.50¢ to 50.00¢
Copper, electrolytic	61.50¢
Copper, reduced	61.50¢
Cadmium, 100-199 lb. 95¢ plus metal value	
Chromium, electrolytic 99.85% min. Fe .03 max. Del'd	$5.00
Lead	7.50¢ plus metal value
Manganese	70.0¢
Molybdenum, 99%	$3.00 to $3.25
Nickel, unannealed	$1.00
Nickel, annealed	$1.06
Nickel, spherical, unannealed, #80	$1.18
Silicon	43.50¢
Solder powder	7.0¢ to 9.0¢ plus met. value
Stainless steel, 302	99.0¢
Stainless steel, 316	$1.32
Tin	14.00¢ plus metal value
Tungsten, 99% (65 mesh)	$4.50
Zinc, 10 ton lots	18.75¢ to 32.50¢

Dow . . . industry's most complete line of chlorinated solvents

DOW

Safer. Lower toxicity and lower fire hazard make Chlorothene much safer for spray applications than other commonly known solvents. Chlorothene has an MAC rating of 500 ppm—20 times greater than carbon tet!

Better solvent action for cold degreasing with versatile, safer

CHLOROTHENE

Chlorothene* (Dow 1, 1, 1—Trichloroethane, Inhibited) is sold exclusively by your Dow distributor. He's also the man who supplies DOW TRICHLOROETHYLENE, DOW PERCHLOROETHYLENE and DOW METHYLENE CHLORIDE for vapor degreasing and other specialized cleaning operations. Write to THE DOW CHEMICAL COMPANY, Dept. S 941A, for more information.

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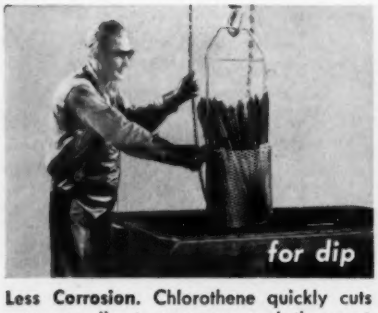


Less Corrosion. Chlorothene quickly cuts greases, oils, tars, waxes and the most stubborn contaminants. Highly stabilized, it has extremely low corrosive effects on all common metals.

Versatile. A product of many uses, Chlorothene is described by enthusiastic users as "the best general-purpose cold degreaser . . . by far the safest and the easiest to use!"

Fast. Chlorothene cleans faster, more thoroughly—poses no skin absorption problem. Its topical effect is similar to that of other good organic solvents.

you can depend on DOW SOLVENTS

DOW

Ferroalloy Prices

(Effective April 10, 1956)

Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk carloads, del'd, 67-71% Cr, .30-1.00% max. Si.

0.02% C	38.50	0.20% C	35.50
0.03% C	38.00	0.50% C	35.25
0.06% C	36.50	1.00% C	34.00
0.10% C	36.00	1.50% C	33.85
0.15% C	35.75	2.00% C	33.75

4.00-4.50 C, 67.70% Cr, 1-2% Si ... 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si ... 25.00
0.025% C (Simplex) ... 31.75

High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.27
0.50% max. C	1.27
9 to 11% C, 88-91% Cr, 0.75% Fe	1.36

Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (⅛" thick) delivered packed. 99.80% min. Cr. (Metallic Base) Fe 0.20 max.

Carloads	1.2[illegible]
Ton lots	1.27
Less ton lots	1.29

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed.

Carloads	41.85
Ton lots	46.15
Less ton lots	48.65

Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed.
30-33% Cr, 60-65% Si, 3.00 max. Fe.

Carloads	22.95
Ton lots	25.25
Less ton lots	26.75

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed.
16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	23.05
Ton lots	24.95
Less ton lots	25.95

SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe ½ in. x 12 mesh.

Ton lots	19.65
Less ton lots	20.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.

Carload lots	17.20
Ton lots	18.70
Less ton lots	19.95

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.50
Ton lots to carload packed	19.65
Less ton lots	20.90

Ferromanganese

Maximum contract base price, f.o.b., lump size, base content 74 to 76 pct Mn.

Producing Point	Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.	10.75
Johnstown, Pa.	10.75
Sheridan, Pa.	10.75
Philo, Ohio	10.75
S. Duquesne	10.75

Add or subtract 0.1¢ for each 1 pct Mn above or below base content.
Briquets, delivered, 66 pct Mn:

Carloads, bulk	13.00
Ton lots packed	15.20

Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.

Manganese	Silicon	
16 to 19%	3% max.	$92.00
19 to 21%	3% max.	94.00
21 to 23%	3% max.	96.50

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	45.75
Ton lots	47.25

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.

Carloads	33.00
Ton lots	35.00
250 to 1999 lb	37.00
Premium for hydrogen-removed metal	0.75

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn. .. 22.85

Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	34.00	35.55	36.75
0.07% max. C	31.95	33.50	34.70
0.10% max. C	30.20	32.75	33.95
0.15% max. C	29.45	32.00	33.20
0.30% max. C	27.95	30.50	31.70
0.50% max. C	27.45	30.00	31.20
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	24.45	27.00	28.20

Silicomanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.

Carload bulk	12.00
Ton lots	13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet	13.55
Ton lots, packed	15.75

Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, packed.

	Ton lots	Carloads
96.50% Si, 2% Fe	22.75	21.45
98% Si, 1% Fe	23.25	21.95

Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	7.15
Ton lots, packed	9.75

Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.

50% Si	12.75	75% Si	15.40
65% Si	14.50	85% Si	17.10
		90% Si	18.50

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

50-55% V contract, basis, delivered, per pound, contained V, carloads, packed.

Openhearth	3.10
Crucible	3.20
High speed steel (Primos)	3.30

Alsifer, 20% Al, 40% Si, 40% Fe.

Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads	10.65¢
Ton lots	11.80¢

Calcium molybdate, 43.6-46.6%

f.o.b. Langeloth, Pa., per pound contained Mo ... $1.34

Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Cb.

Ton lots	$6.90
Less ton lots	6.95

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb con't Sb plus Ta ... $4.65

Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloth, Pa., per pound contained Mo ... $1.54

Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $4.00 unitage, per gross ton ... $90.00
10 tons to less carload ... $110.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.35

Ferrotitanium 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti ... $1.50
Less ton lots ... $1.55

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload, per net ton ... $177.00

Ferrotungsten, ¼ x down, packed, per pound contained W, ton lots, delivered ... $3.45

Molybdic oxide, briquets, per lb contained Mo, f.o.b. Langeloth, Pa. ... $1.32
bags, f.o.b. Washington, Pa., Langeloth, Pa. ... $1.30

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

Carload, bulk lump	17.50¢
Ton lots, packed lump	19.50¢
Less ton lots	20.00¢

Vanadium oxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 ... $1.33

Zirconium contract basis, per lb of alloy

35-40%, f.o.b. freight allowed, carloads, packed	26.25¢
12-15%, del'd, lump, bulk-carloads	8.50¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed. B 3.14%, Si 40-45%, per lb contained 2 ... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4.5-7.5% f.o.b. Suspension Bridge, N. Y., freight allowed
Ton lots per pound ... 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots ... 1.20
F.o.b. Wash., Pa.; Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B	.85
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over

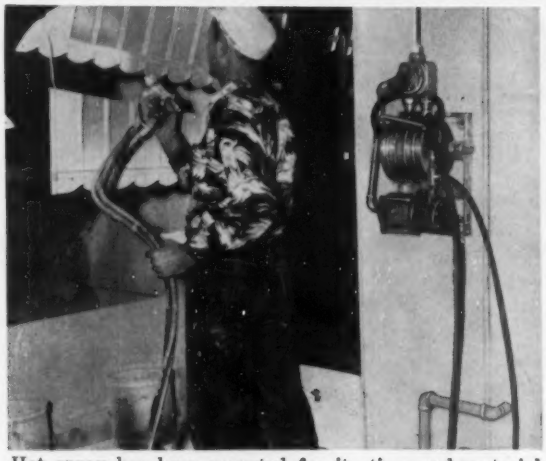
No. 1	$1.05
No. 79	50¢

Manganese-Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.
D, del'd.
Ton lots ... $1.46
Less ton lots ... 1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots ... $2.05

(Advertisement)

WEATHER EXPOSURE TESTS SHOW HOT SPRAY EXTENDS PRODUCT LIFE



Hot spray has been accepted for its time and material savings in industrial finishing . . . salt-spray tests on hot vs. cold sprayed products show better adhesion and improved gloss retention. Better impact resistance with hot spray application is also claimed by a prominent manufacturer of aluminum awnings. All of the tests made with Spee-Flo Hot Spray Heaters have shown that the hot spray process evaporates a major portion of the solvent between gun and surface, leaving a denser, less porous film, free of pin-hole defects. The improved film integrity has widened trade interest in the hot-spray process.

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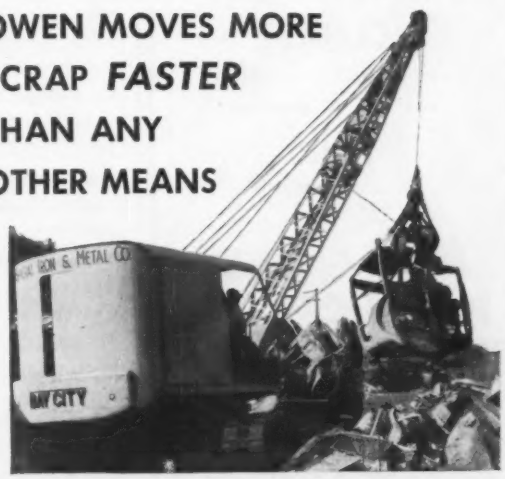

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THE CLEARING HOUSE

News of Used and Rebuilt Machinery

Business Booming In Calif. . . . "Business is terrific."

"We're going to beat our 1955 sales by a mile."

"We're doing swell but sweating over supplies."

That's the consensus of opinion among used machinery dealers on the West Coast.

Biggest beef is not enough late-model machines in the big sizes, particularly mills, lathes, turret lathes, radial drills, and planers.

Los Angeles dealers report the search as far afield as Midwest and East to find what they need. One dealer says, "I'm paying as much in freight as a lot of this old equipment's worth."

Much of the real old machinery is selling at pretty fair prices in southern California. Buyers like the older machines because of their heavy cast iron construction. These hefty pieces of equipment make good solid bases for rebuilding into special-purpose machines, they say.

Good Price For Oldies . . . One firm picked up an old turret lathe, 1920 model, and altered it to an automatic machine, using the body, head, and turret of the old lathe. Another firm turned an old shaper into a large duplicator—big enough to handle 30-in. widths.

Southern California best seller list includes sheet metal equipment, with the accent on punch presses, brakes, and shears. Biggest users are the electronics, aircraft, and guided missiles manufacturers.

If there are any blues singers among northern California used machinery dealers, they certainly can't be heard. Almost every one in the San Francisco Bay Area is exuberant. One dealer says his business for the first quarter is "up about 300 pct over last year." Hikes of 30 pct to 40 pct are common.

Dealers generally feel the boom demand enjoyed thus far this year will continue. They consider the numerous new industries moving into northern California as a convincing reason.

What are the best movers? Milling machines, shapers, radial drills, ram type turret lathes, and engine lathes.

New Equipment . . . Newer stuff sells best. In fact, one dealer says good merchandise, not more than 10 years old, commands prices ranging close to 70 pct of cost of new equipment.

This same dealer feels about 90 pct of the strong used machinery demand stems from manufacturers caught in the new machinery backlog jam. They'd prefer new equipment but they can't wait.

"Clunkers" will sell too, according to this dealer, but at a correspondingly lower price. "But the market for such lower quality merchandise is not too good," he adds.

Despite the strong demand in the San Francisco Bay Area, few dealers are reaching back East for used machinery because prices in the East are too high to carry the additional freight costs. One dealer reports he will handle special orders in the East for local customers if the customer agrees to pay the freight.

Another dealer, who is buying some machinery from Chicago and Detroit, says this is necessary because some of the equipment in demand here just isn't generated locally. He cites heavy lathes, 50 in. and over, big planers and boring mills.

Gloomy Seattle . . . Only gloomy spot right now is Seattle. Used machinery dealers say demand for their equipment is at a standstill, after a steady decline from the first of the year.

Whether the decline in activity can be attributed to a current Machinists Union strike threat or to other factors is a question used machinery dealers here cannot or will not answer.

CONSIDER GOOD USED EQUIPMENT FIRST

BENDING ROLLS
8' x ⅜" Hilles & Jones Pyramid Type
14' x 3/16" Hilles & Jones Pyramid Type
12' x ⅜" Cleveland Pyramid Type
16' x ⅜" Nile Pyramid Type
20' x ⅜" Bersch Pyramid Type
24' x ½" Hilles & Jones Pyramid Type
27' x 1" Southwark Pyramid Type

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump
12' x ⅜" Dreis & Krump
12' x ½" Dreis & Krump, Motor Driven

BRAKES—PRESS TYPE
12' x 3/16" Cincinnati
14' x ⅜" Cincinnati Series 120-14

BULLDOZERS
#5 Williams & White, 29" Stroke, 11⅛" x 63" Face of Crosshead
#27 Williams & White, 22" Stroke, 16" x 80" Face of Crosshead

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P&H	29' Span	230 Volt D.C.
5 ton P&H	80' Span	220/3/60 A.C.
5 ton Cleveland	96' Span	230 Volt D.C.
7½ ton P&H	65' Span	440/3/60 A.C.
7½ ton Bedford	70' Span	440/3/60 A.C.
10 ton Milwaukee	80' Span	230 Volt D.C.
10 ton P&H	96' Span	220 Volt D.C.
120 ton Whiting	80' Span	220/3/60 A.C.

DUPLICATOR
Type BG-3 10' x 14'6" Pratt & Whitney Keller Automatic Duplicator

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1" to 7" Acme, Ajax, National

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Hevi-Duty Electric Furnace, Hot Zone 18" high, 26" Wide Opening, 16'9" Deep I.D.
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#3B Lobdell Nazel, Capacity 4" Square
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LEVELERS—ROLLER
18" United, 13 Rolls 1½" Dia.
90" Budd-McKay Sheet Processor & Leveler, Leveling Rolls 3⅝" dia.

PRESS—GAP FRAME
125 ton Beatty Inclined Open Back Gap Press. Stroke 1¼". Bed Area 28⅞" x 26⅞" (New)

PRESSES HYDRAULIC
530 ton Baldwin Southwark 12" Stroke 48" x 25" Between Columns
800 ton Clearing 48" Stroke, Bed Area 48" x 48"
1000 ton Lake Erie Double Acting 46" Stroke. Bed Area 72" x 146"
1257 ton Baldwin Southwark Forging Press, 30" Stroke Main Ram, 54" x 41" Bet. Columns
4500 ton B-L-H Hydr. Forging Press

PRESSES—STRAIGHT SIDE
60D-84 Cleveland Double Crank, 14" Stroke, Bed Area 46" x 84"
#8½ 4P Zeh & Hahnemann Percussion Press 75 ton Clearing Model TF41500-200 Triple Acting. Strokes 40, 32, 14". Bed Area 100" x 200"

PRESS—TOGGLE
DF2450-118 Clearing 4-Point Mech. Dbl. Acting. Stroke of Plunger 37", Blankholder 26", Bed Area 60" x 120"

PUNCH & SHEAR COMBINATIONS
Style EF Cleveland 36" Throat, Punch 1⅛" thru 1" Style W Cleveland 60" Throat, 312 Ton

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12" x 16" Phila., Single Stand, Two High
15" x 28" Farrel Single Stand, Two High
15" x 30" G & M Single Stand, Two High
16" x 21" Farrel Single Stand, Two High
22" x 12" x 40" Lewis 3-High Sheet Mill
12" Three High Bar Mill
28" x 54" United Four Stand, Two High

ROLLS—FORMING
8 Stand Rafter Tube Forming Machine, Spindle 1⅞"
5 Stand Bliss Roll Forming Machine, Shaft 2⅞"

SHEAR—BILLET
No. 7 Hilles & Jones, Motor Drive. Cap. 5" Sq.

SHEARS—GATE
80" x ⅝" Pels
86" x 1" Hilles & Jones
12' x 1" Morgan

SHEARS—ANGLE
6 x 6 x ⅝" Cleveland
8 x 8 x 1" Hilles & Jones

SHEARS—SQUARING
12' x 3/16" Cincinnati #1412
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12' x ⅝" Steelweld

SLITTERS
36" Yoder Slitting Line
G-48 Yoder Gang Slitter, 5" Threaded Arbor

STRAIGHTENERS
Kane & Roach 2 Roll Rotary Straightener, M.D. Capacity Mildsteel ¼" to ⅜"
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Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	1200	G.E.	MCF	600	650/800
1	1000	G.E.	MCF	600	350/700
1	940	Whse.	QM	250	140/170
1	800	Whse.		250	450/550
1	500	Whse.	CC-216	600	300/900
1	500	G.E.	MCF	230	250/750
3	450	Whse.		550	415
1	250	G.E.	MPC	230	400/600
1	200	G.E.	CD-1650Z	230	500/1500
1	200	Whse.	CB-5113	230	400/800
1	150	G.E.		600	250/750
1	150	Cr. Wh.	65H	230	1150
2	150	Cr. Wh.	83H-TEFC	230	830
1	150	Whse.	8K-151B	230	900/1800
1	150	Whse.	8K-201	230	360/950
1	120	G.E.	MCF	230	250/1000
1	125	Whse.	8K-183	230	850
8	100	Rel.	1050T	230	400/1200
2	100	Whse.	8K-181	230	450/1000
2	75	C.W.	53H-TEFC	230	860
1	50	G.E.	MD-412AE	230	550

M-G Sets—3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
1	3000(3U)	G.E.	514	600	4000/6900/13200
2	2000/2400	G.E.	450	250/300	2300/4600
1	1750/2100	G.E.	514	250/300	2300/4600
1	2000	G.E.	500	25eg 660	11000
1	2000	G.E.	514	660	2300/4600
1	1500	G.E.	720	600	6600/13200
1	1250	Whse.	720	600	2300
1	750	Whse.	900	250	2300/4000
1	500	Whse.	900	125/250	440
1	200	Whse.	1200	250	440

TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
3	1000	G.E.	HVDDJ	1	2400x480
6	1000	Wagner	OISC	1	13200x460
3	667	G.E.	HD	1	13800x2300
3	500	Kuhl	OISC	1	13200x6600
3	333	G.E.	HS	1	7200x2400/4160Y
3	333	G.E.	HD	1	13200x2300
3	333	G.E.	HSWR	1	2300/4000x230/460
1	300	G.E.	HT	3	4160x480/277
3	250	Penn.	DISC	1	34500x120/240
3	200	Whse.	OISC	1	13200x120/240
3	200	G.E.	HKS	1	4800/2400x230/460
1	150	G.E.	HT	3	27060x125/216

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No. 6B Nazel, self-contained.

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24" x 8' LeBlond H. D. engine lathe.
14" x 6' Handey Toolroom, 1940.
15" x 30" Lipe Carbo-Matic, 1942.

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2-18 Cincinnati production, late model.
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250 ton No. 79S½-72 Toledo D.C. Toggle drawing.
500 ton No. 1039 Hamilton D.C. adj. bed, 60" x 102".
545 ton No. H3612½ Hamilton Forging Press.

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6	1500	Whse.	Mill	525	600
1	1250	G.E.	MCF	600	350/700
4	800	Whse.	Encl.	525	600
4	700	Whse.	Mill	250	300/700
2	600	Al. Ch.	Mill	600	300/600
2	500	Whse.	Mill	250	285/710
1	450/250	Al. Ch.	Mill	375/250	250/1000
1	450	Whse.	SK	230	450/600
1	350	G.E.	CD-169	230	1150
1	200/250	El. Dy.	Ped. Brg.	230	400/1200
1	200	Whse.	SK-210	230	400/800
1	180	G.E.	MPC	230	400
1	150	Whse.	SK-201	230	300/900
2	125	Whse.	SK-184	230	575/850
1	125	G.E.	MPC	230	400/600
1	100	El. Dy.	30-8	230	450/1350
2	100	El. Dy.	30-8	230	475/950
1	80	Reliance	651-T	230	575/1150
3	50	Whse.	SK-131.5	230	600/2200
1	40	G.E.	CD-123	230	500/1000
1	40	Whse.	SK-140	230	500/1700
1	32½	Whse.	SK-150	230	400/1200
2	25	Whse.	SK-93	230	1800
1	20	Cr. Wh.	D.P.B.B.	230	1150/2400
1	20	Whse.	SK-123	230	400/1200
1	15	G.E.	CD-85	230	575/2300
3	15	Whse.	SK-100L	230	500/1500
1	15	Reliance	155-T	230	400/1600
1	10	Whse.	SK-103	230	400/1600
1	10	Al. Ch.	E-122	230	300/1200
4	10	Whse.	SK-91	230	250/1000
1	7½	G.E.	CD-75	230	690/2070
1	7½	G.E.	CD-85	230	450/1350
4	5/7½	Reliance	T.E.F.C.	230	337/1350

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Qu.	KW	Make	R.P.M.	D.C. Volts	A.C. Volts
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2	1250	Whse.	720	600	2300
1	500	Cr. Wh.	720	600	2300/440
2	500	Whse.	1200	125/250	2300/440
1	400	Cr. Wh.	1200	125/250	2300/440
1	300	G.E.	1200	250	2300
3	200	G.E.	900	125/250	2300
1	150	G.E.	1200	250	2300
1	100	Whse.	900	250	2300
1	100	Cr. Wh.	1200	125	440/220
1	75	G.E.	1200	250	440/220
3	50	G.E.	1200	250	440/220

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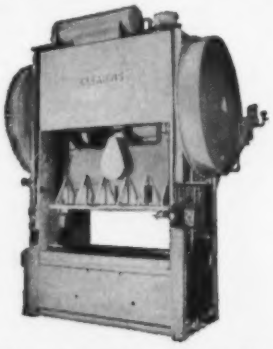

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100	G.E.	RC-34	2500
100	G.E.	RC-19	575
100/150	G.E.	MCF	380/1000
50/120	G.E.	MCF	250/1000
50	Cr. Wh.	CMC	700/1100
50	G.E.	DLC-204	650
35	Westg.	SK-150	350/1000
30	Cr. Wh.	CCM-504	450
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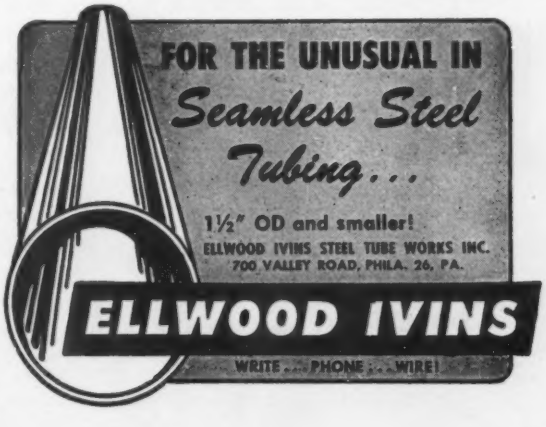
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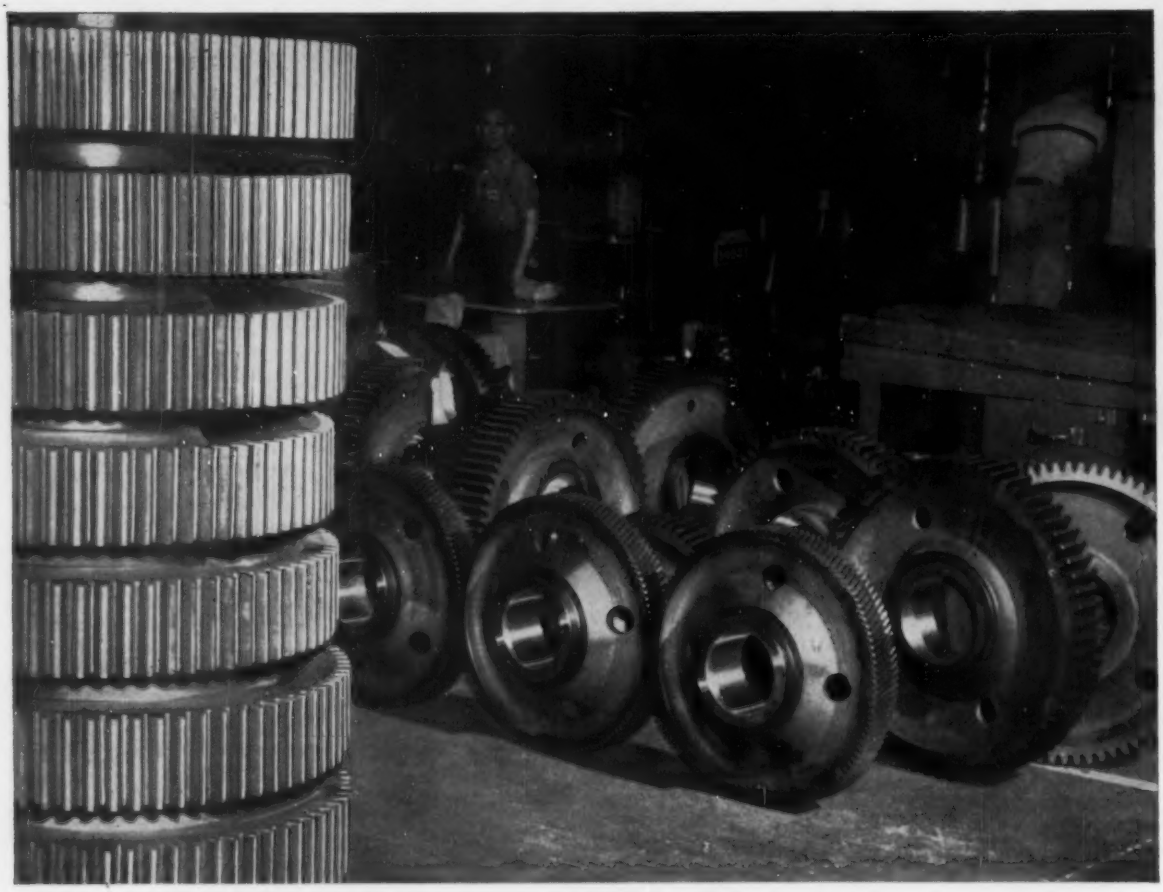

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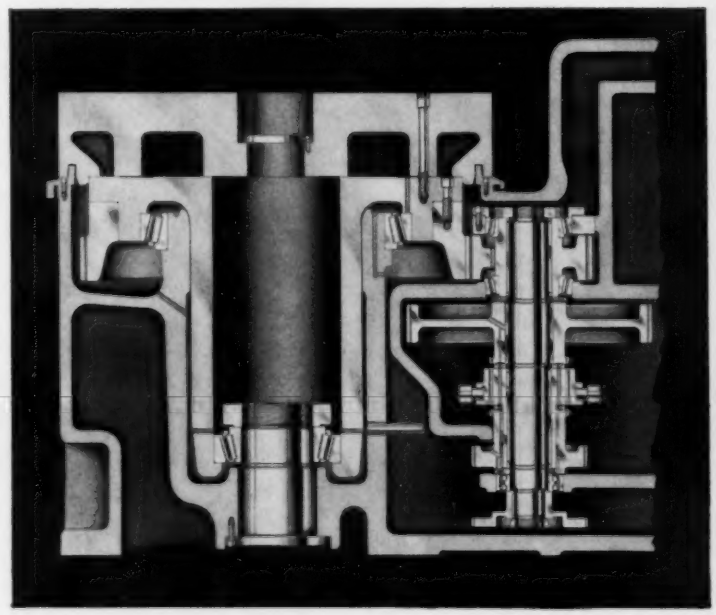

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